TOSHIBA

FILE NO. A03-003
Revised Nov. 2003

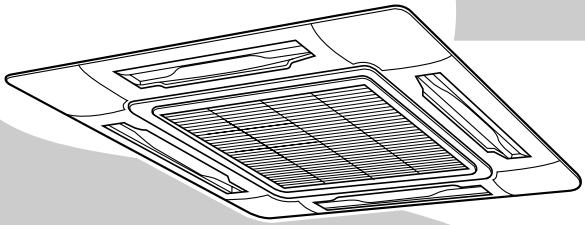
SERVICE MANUAL

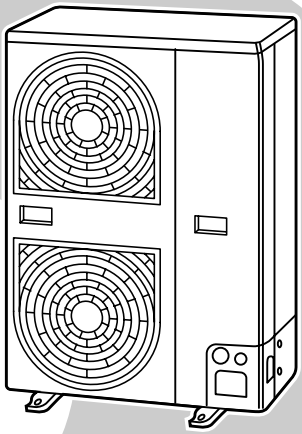
AIR-CONDITIONER
SPLIT TYPE

RAV-SM1100UT-E/RAV-SM1400UT-E
RAV-SM1100AT-E/RAV-SM1400AT-E

File No. A03-003 in the page of the following table has been changed, and the portion is expressed as [ ] mark.

Revised page	2, 5, 7, 9, 10, 17, 24, 27, 40, 41, 63, 90, 93 Cord Heater Installation Work





HFC
R410A

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1. SPECIFICATIONS

1-1. Specifications

1-1-1. Indoor Unit (4-Way Air Discharge Cassette Type)

Model name				RAV-SM1100UT-E			RAV-SM1400UT-E		
Standard capacity (Note 1)			(kW)	Cooling	Heating	Average	Cooling	Heating	Average
				10.0 (2.2 – 11.2)	11.2 (2.2 – 13.0)		12.3 (3.0 – 13.2)	14.0 (3.0 – 16.0)	
Energy consumption effect ratio (Cooling)				2.84	3.22	3.03	3.01	3.50	3.26
Electrical characteristics	Power supply			1 phase 230V (220 – 240V) 50Hz					
	Running current		(A)	16.3–15.0	16.1–14.8		19.2–17.6	18.7–17.2	
	Power consumption		(kW)	3.52	3.48		4.09	4.00	
	Power factor		(%)	98	98		97	97	
Appearance	Main unit			Zinc hot dipping steel plate					
	Ceiling Panel (Sold separately)	Model		RBC-U21PG (W)-E					
		Panel color		Moon-white (Muncel 2.5GY 9.0/0.5)					
Outer dimension	Main unit	Height	(mm)	256			319		
		Width	(mm)	840			840		
		Depth	(mm)	840			840		
	Ceiling panel (Sold separately)	Height	(mm)	35					
		Width	(mm)	950					
		Depth	(mm)	950					
Total weight	Main unit		(kg)	22			26		
	Ceiling panel			4.5					
Heat exchanger				Finned tubu					
Fan unit	Fan			Turbo fan					
	Standard air flow High (Mid./Low)		(m^3/h)	1680			1980		
	Motor		(W)	60			90		
Air filter				Attached ceiling panel					
Controller (Sold separately)				RBC-AMT21E					
Connecting pipe	Gas side		(mm)	Ø15.9 (5/8”)					
	Liquid side		(mm)	Ø9.5 (3/8”)					
	Drain port		(Nominal dia.)	25 (Polyvinyl chloride tube)					
Sound level	High (Mid./Low) (Note 2)		(dB•A)	39	36	33	42	38	34

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions speciied by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

1-1-2. Outdoor Unit

Model name				RAV-SM1100AT-E	RAV-SM1400AT-E
Appearance				Silky shade (Muncel 1Y8.5/0.5)	
Power supply				1 phase 230V (220 – 240V) 50Hz (Power exclusive to outdoor is required.)	
Compressor	Type			Hermetic compressor	
	Motor		(kW)	2.0	3.75
	Pole			4 poles	
Refrigerant charged			(kg)	R410A 2.1	R410A 2.3
Refrigerant control				Pulse motor valve	
Pipe	Standard length			20 (without additional charge)	
	Max. total length		(m)	50	
	Over 20m			Add 40g/m (Max. 1200g)	
	Height difference	Outdoor lower	(m)	15	
		Outdoor higher	(m)	30	
Outer dimension	Height		(mm)	1340	
	Width		(mm)	900	
	Depth		(mm)	320	
Total weight			(kg)	75	85
Heat exchanger				Finned tube	
Fan unit	Fan			2 propeller fans	
	Standard air flow High		(m^3/h)	6800	7500
	Motor		(W)	63 + 43	63 + 63
Connecting pipe	Gas side		(mm)	Ø15.9 (5/8")	
	Liquid side		(mm)	Ø9.5 (3/8")	
Protection device				Discharge temp. sensor Over-current sensor Compressor thermo.	
Sound level (Note 2)	High (Mid./Low) (Cooling/Heating)		(dB•A)	53/54	53/54

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions speciied by JIS B 8616 based on the reference piping 7.5m.

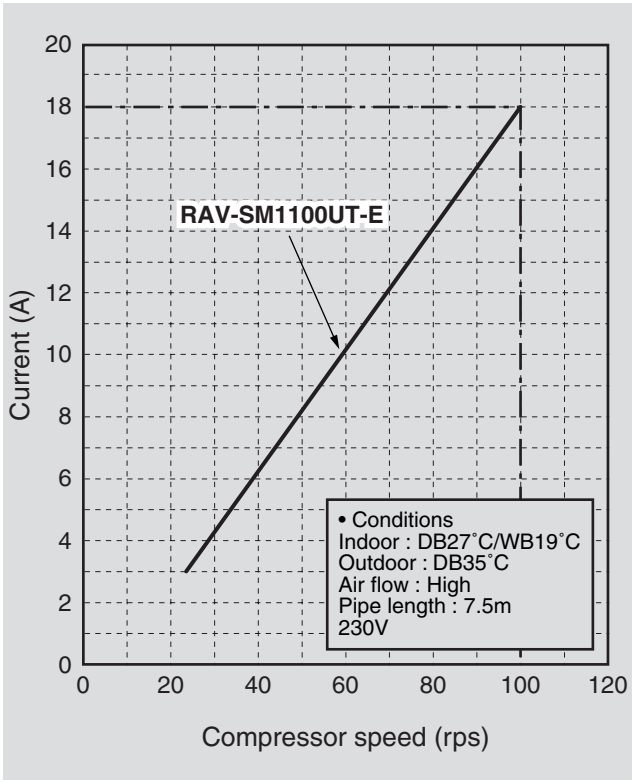
Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

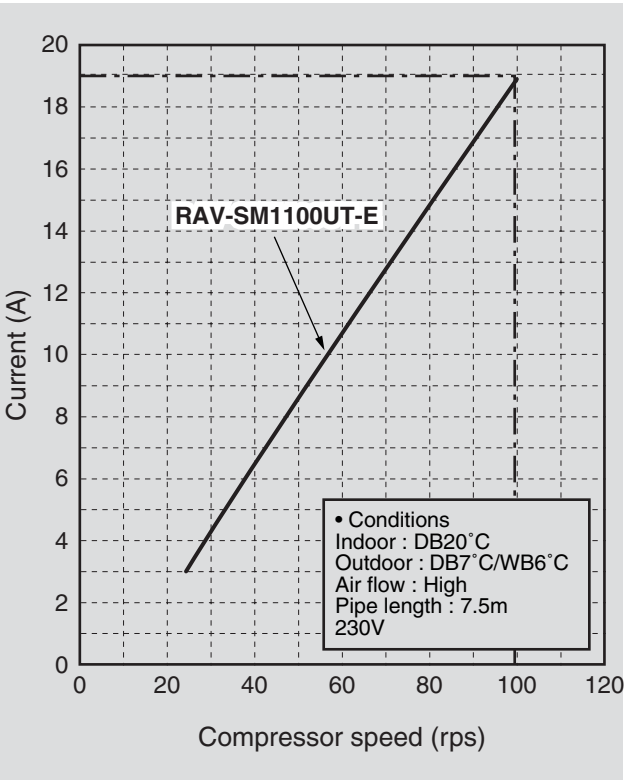
1-2. Operation Characteristic Curve

RAV-SM1100UT-E

<Cooling>

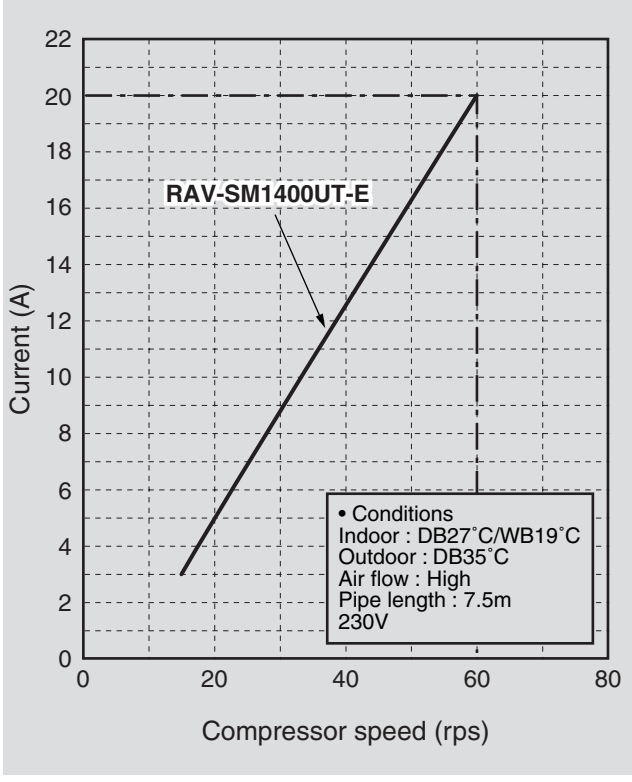


<Heating>

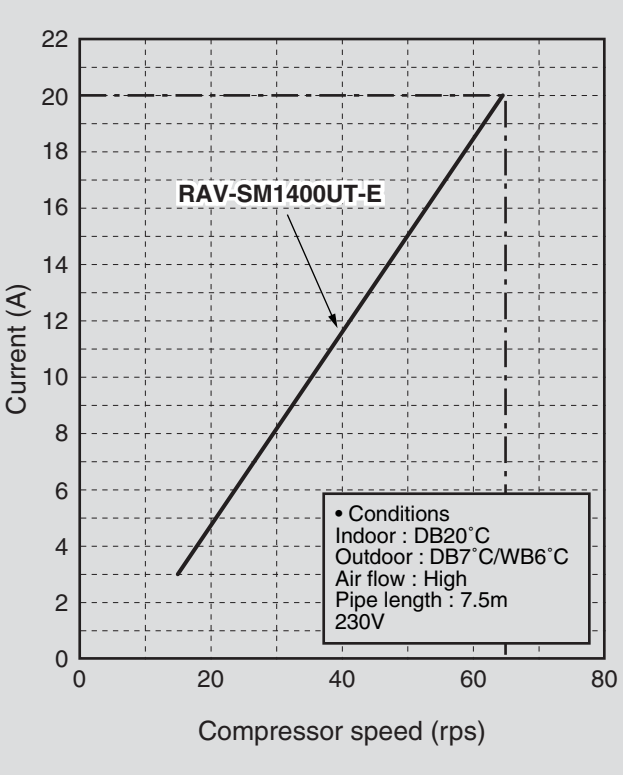


RAV-SM1400UT-E

<Cooling>

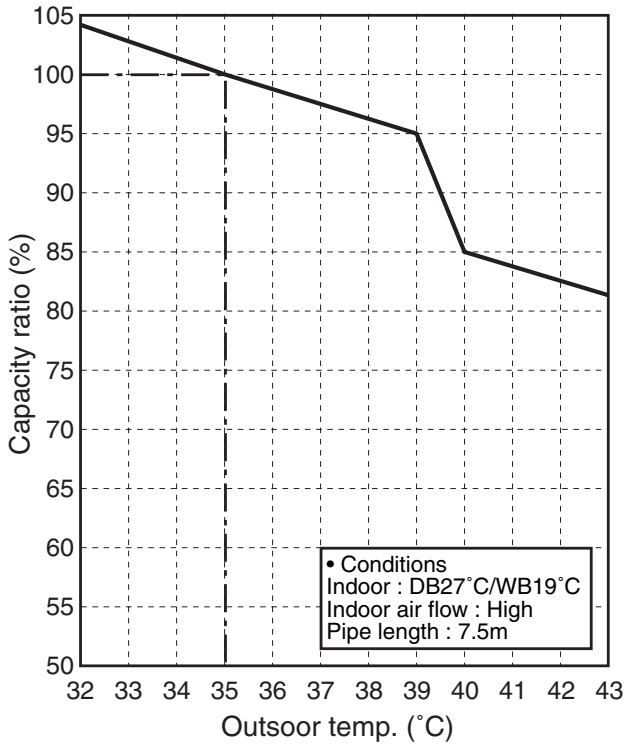


<Heating>

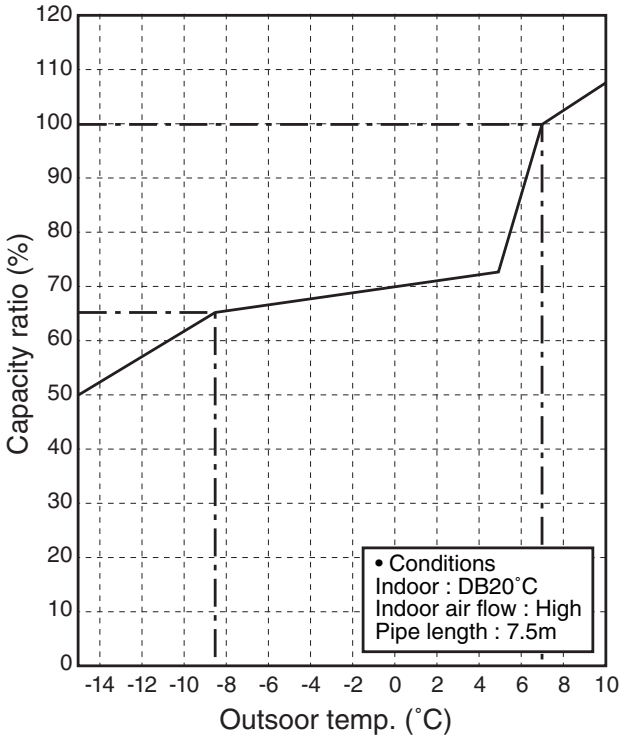


1-3. Capacity variation ratio according to temperature

<Cooling>



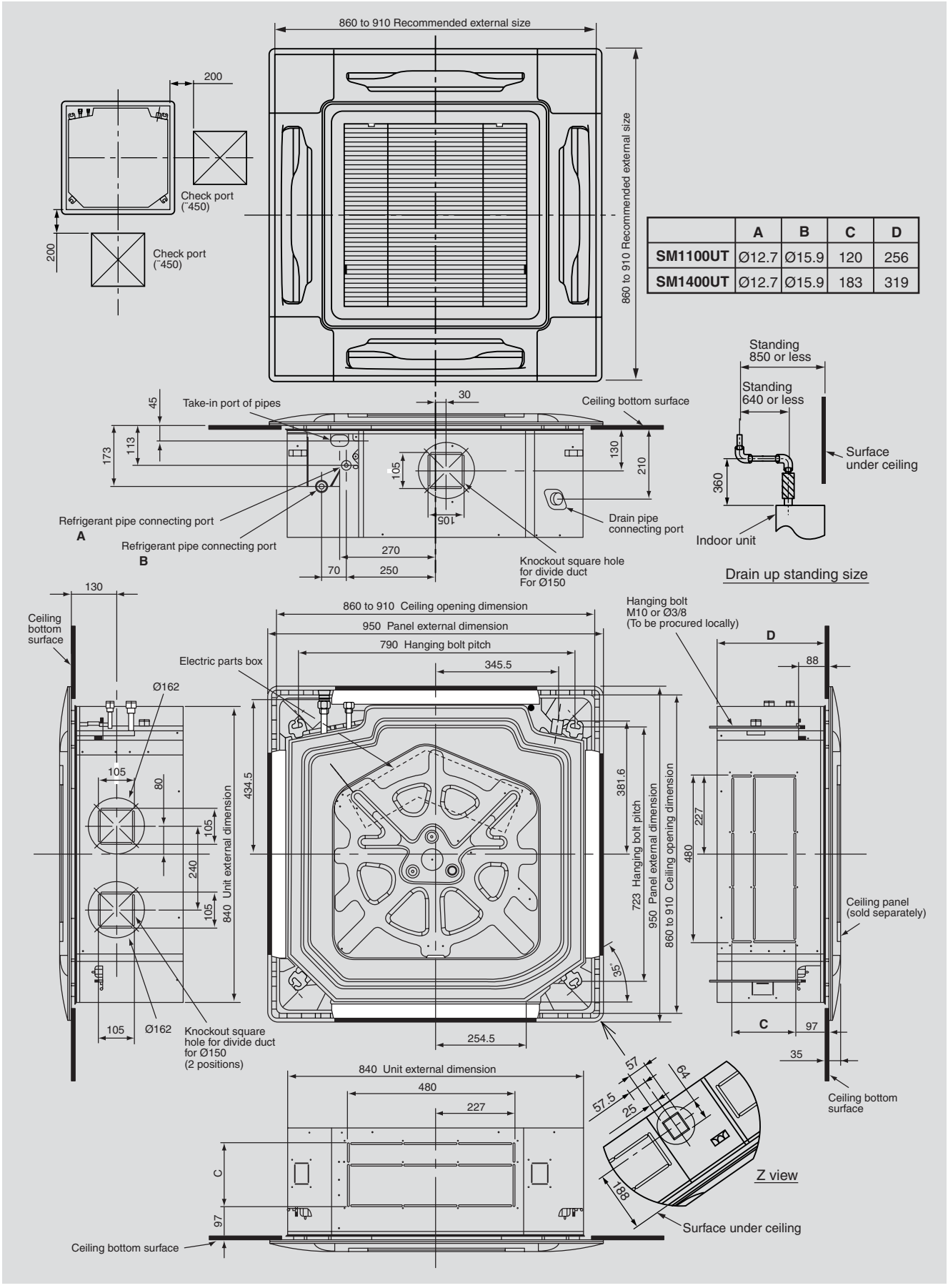
<Heating>



2. CONSTRUCTION VIEWS (EXTERNAL VIEWS)

2-1. Indoor Unit

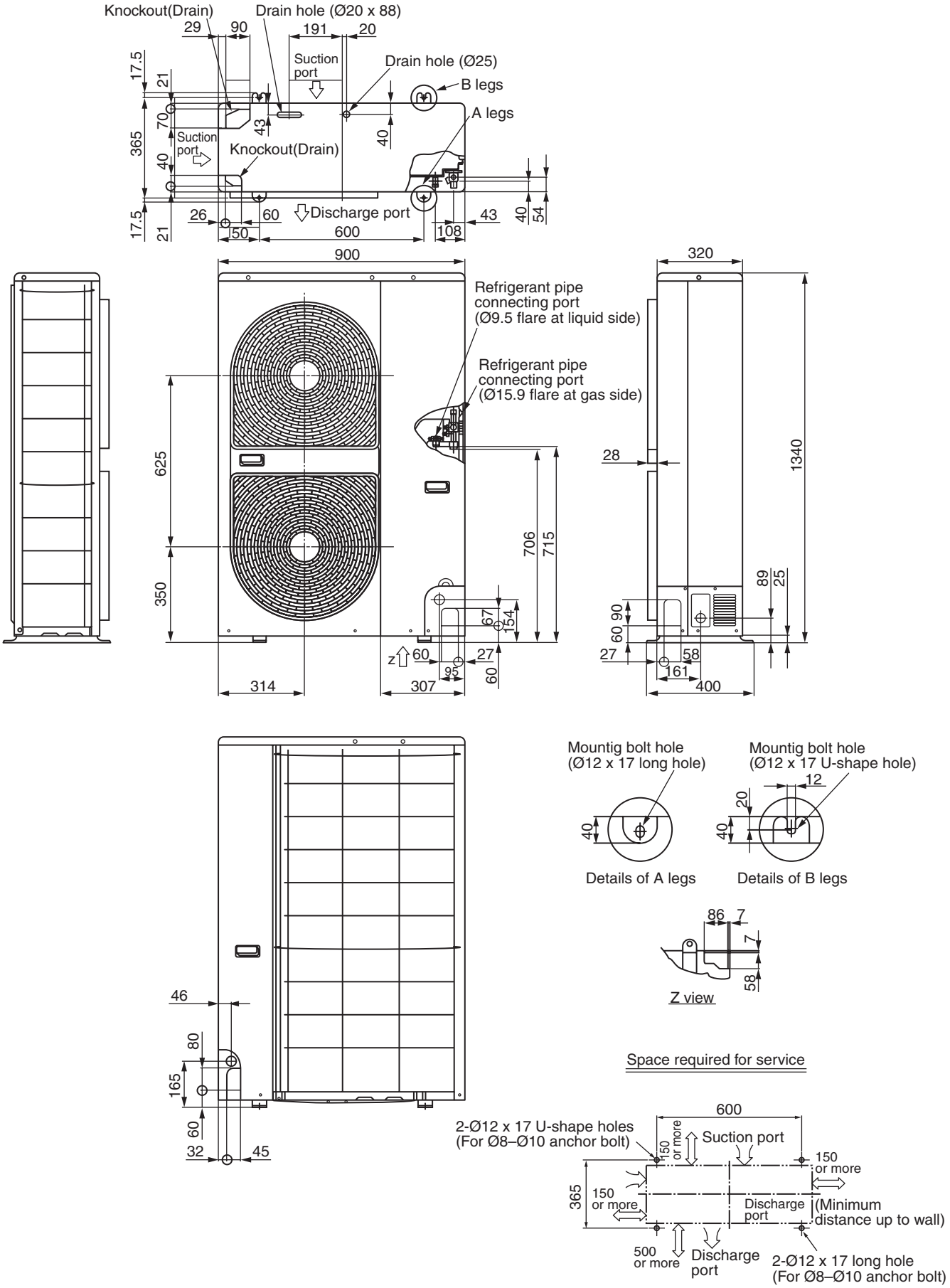
RAV-SM1100UT-E/RAV-SM1400UT-E



	A	B	C	D
SM1100UT	Ø12.7	Ø15.9	120	256
SM1400UT	Ø12.7	Ø15.9	183	319

2-2. Outdoor Unit

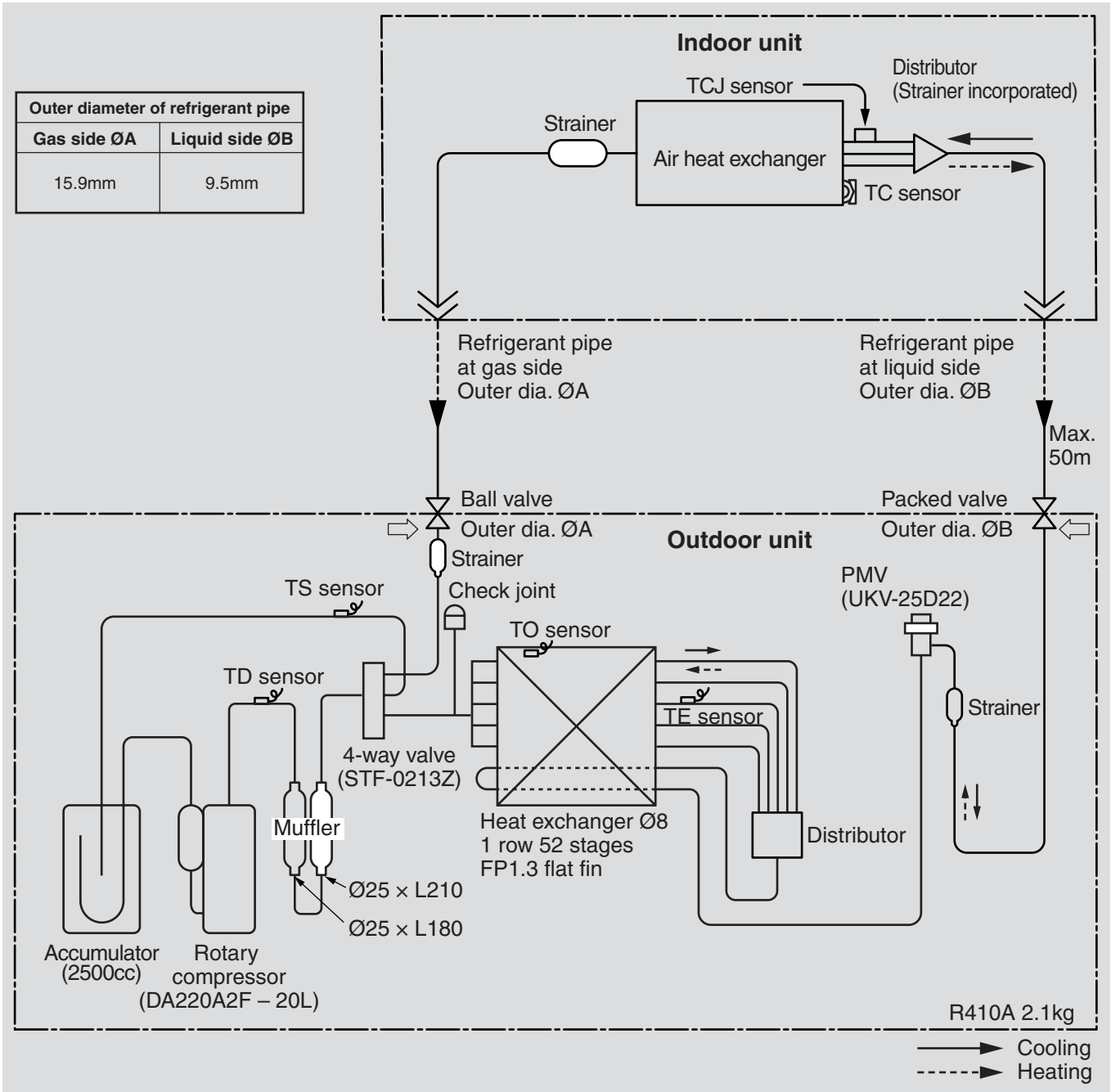
RAV-SM1100AT-E/RAV-SM1400AT-E


Knockout(Drain)
Drain hole (Ø20 x 88)
Suction port
Drain hole (Ø25)
B legs
A legs
Knockout(Drain)
Discharge port
Refrigerant pipe connecting port (Ø9.5 flare at liquid side)
Refrigerant pipe connecting port (Ø15.9 flare at gas side)
Mountig bolt hole (Ø12 x 17 long hole)
Mountig bolt hole (Ø12 x 17 U-shape hole)
Details of A legs
Details of B legs
Z view
Space required for service
2-Ø12 x 17 U-shape holes (For Ø8–Ø10 anchor bolt)
Suction port
Discharge port
(Minimum distance up to wall)
2-Ø12 x 17 long hole (For Ø8–Ø10 anchor bolt)

3. SYSTEMATIC REFRIGERATING CYCLE DIAGRAM

3-1. Indoor Unit/Outdoor Unit

RAV-SM1100UT-E/RAV-SM1100AT-E

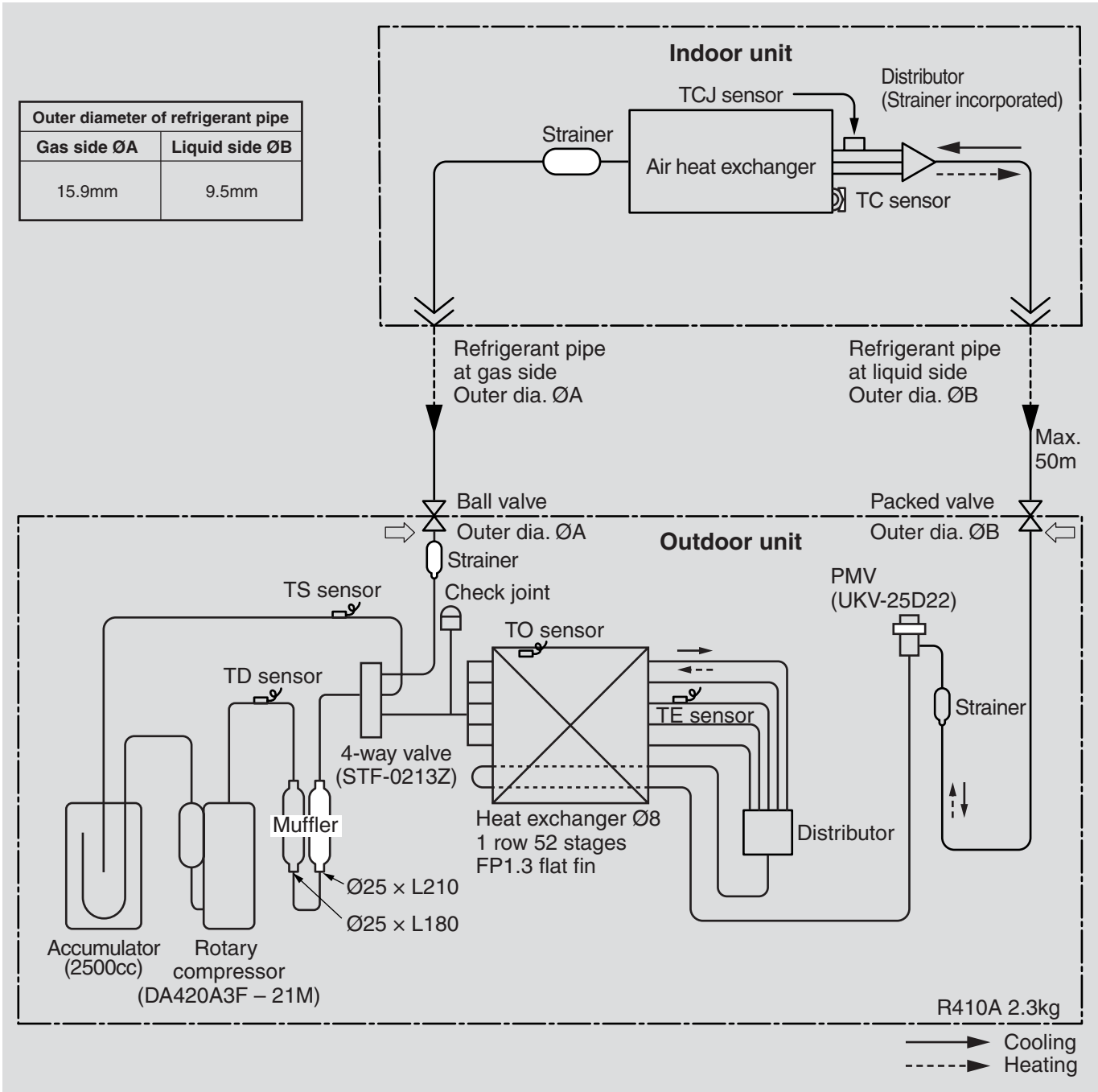


		Pressure (MPa)		Pipe surface temperature (°C)				Compressor revolutions per second (rps) *	Indoor fan	Indoor/Outdoor temp. conditions (DB/WB) (°C)	
				Discharge	Suction	Indoor heat exchanger	Outdoor heat exchanger				
		Pd	Ps	(TD)	(TS)	(TC)	(TE)			Indoor	Outdoor
Cooling	Standard	3.3	0.9	88	10	8	38	92	HIGH	27/19	35/–
	Overload	3.0	1.0	88	14	14	46	74	HIGH	32/24	43/–
	Low load	1.0	0.8	30	8	8	3	27	LOW	18/15.5	-5/–
Heating	Standard	2.5	0.6	90	4	50	2	86	HIGH	20/–	7/6
	Overload	3.3	1.1	83	17	54	13	52	LOW	30.–	24/18
	Low load	1.8	0.2	80	-23	29	-20	100	HIGH	15/–	-20/ (70%)

* 4 poles are provided to this compressor.

The compressor frequency (Hz) measured with a clamp meter is 2 times of revolutions (rps) of the compressor.

RAV-SM1400UT-E/RAV-SM1400AT-E



		Pressure (MPa)		Pipe surface temperature (°C)				Compressor revolutions per second (rps) *	Indoor fan	Indoor/Outdoor temp. conditions (DB/WB) (°C)	
				Discharge	Suction	Indoor heat exchanger	Outdoor heat exchanger				
		Pd	Ps	(TD)	(TS)	(TC)	(TE)			Indoor	Outdoor
Cooling	Standard	3.3	0.9	84	11	10	40	56	HIGH	27/19	35/–
	Overload	3.5	1.0	87	7	15	54	54	HIGH	32/24	43/–
	Low load	1.7	0.8	44	8	4	8	27	LOW	18/15.5	–5/–
Heating	Standard	3.0	0.6	79	2	44	2	60	HIGH	20/–	7/6
	Overload	3.4	1.1	78	21	54	17	24	LOW	30.–	24/18
	Low load	2.0	0.2	82	–21	36	–18	73	HIGH	15/–	–20/ (70%)

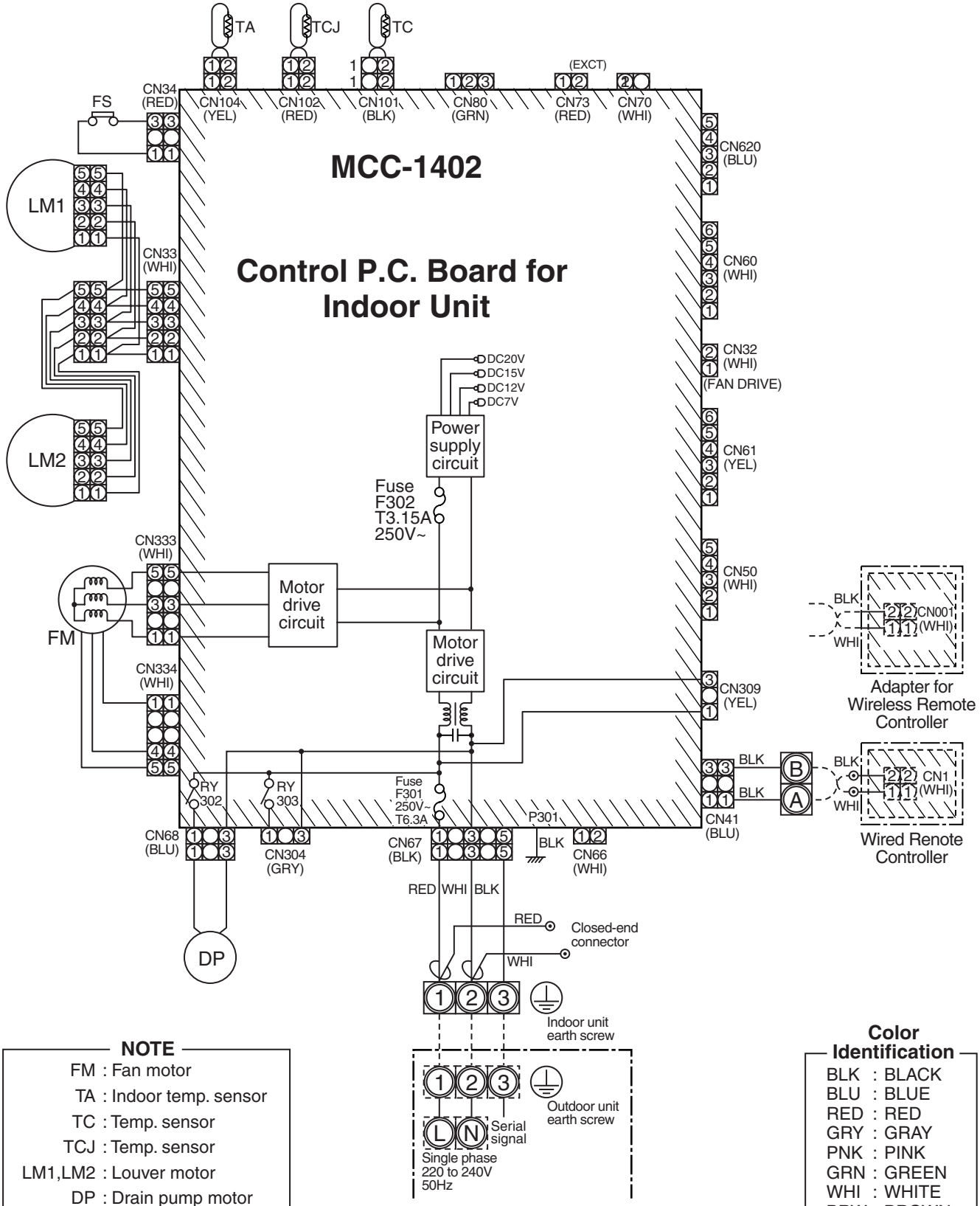
* 4 poles are provided to this compressor.

The compressor frequency (Hz) measured with a clamp meter is 2 times of revolutions (rps) of the compressor.

4. WIRING DIAGRAM

4-1. Indoor Unit

RAV-SM1100UT-E/RAV-SM1400UT-E



NOTE

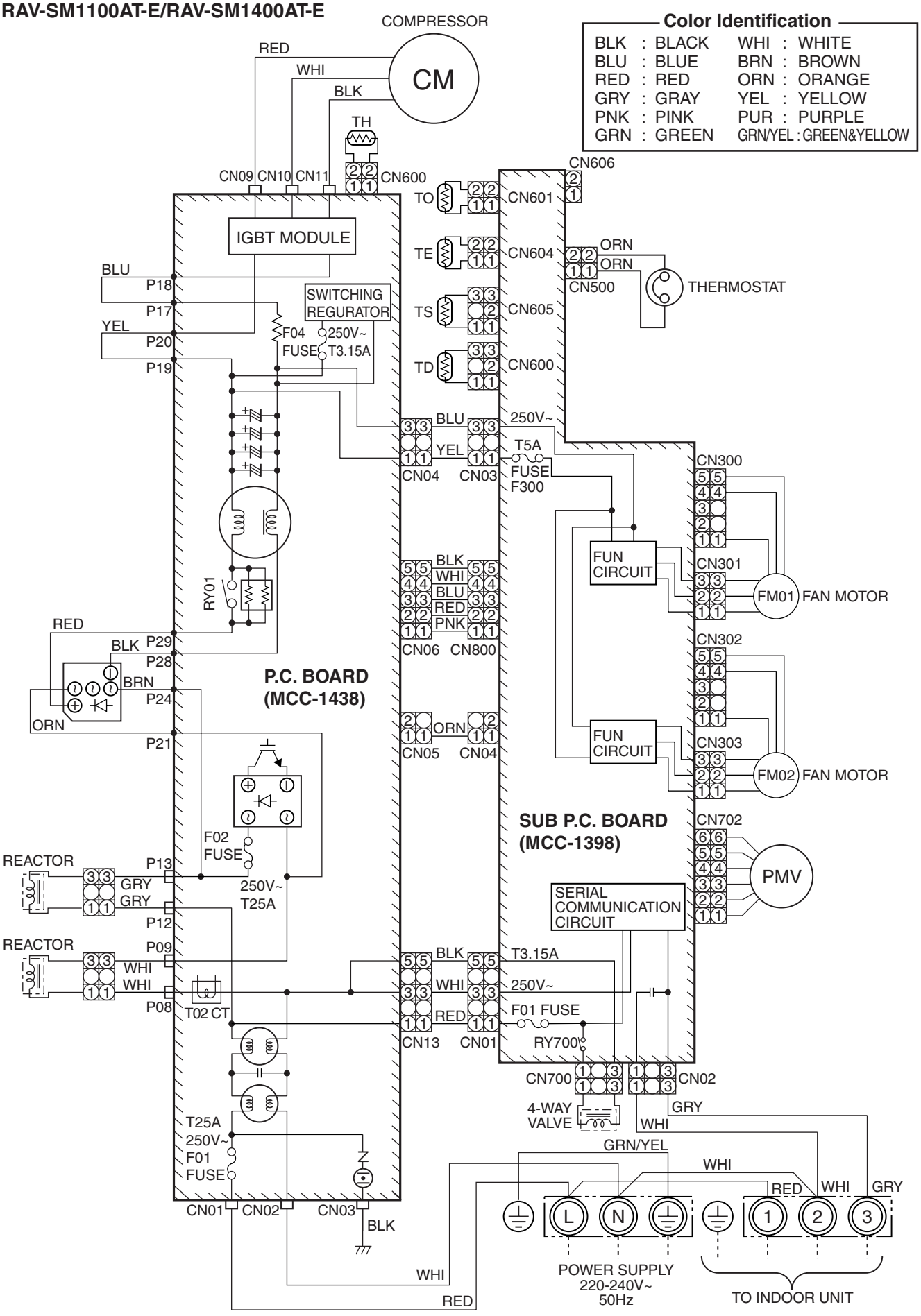
FM	: Fan motor
TA	: Indoor temp. sensor
TC	: Temp. sensor
TCJ	: Temp. sensor
LM1,LM2	: Louver motor
DP	: Drain pump motor
FS	: Float switch
RY302	: Drain control relay

Color Identification

BLK	: BLACK
BLU	: BLUE
RED	: RED
GRY	: GRAY
PNK	: PINK
GRN	: GREEN
WHI	: WHITE
BRW	: BROWN
ORN	: ORANGE
YEL	: YELLOW

4-2. Outdoor Unit

RAV-SM1100AT-E/RAV-SM1400AT-E



5. SPECIFICATIONS OF ELECTRICAL PARTS

5-1. Indoor Unit

RAV-SM1100UT-E/RAV-SM1400UT-E

No.	Parts name	Type	Specifications
1	Fan motor	SWF-230-60-1 (RAV-SM1100UT-E)	Output (Rated) 60 W
		SWF-230-90-1 (RAV-SM1400UT-E)	Output (Rated) 90 W
2	Thermo. sensor (TA-sensor)	155 mm	10 kΩ at 25°C
3	Heat exchanger sensor (TCJ-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
4	Heat exchanger sensor (TC-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
5	Float switch	FS-0218-102	
6	Drain pump motor	ADP-1409	

5-2. Outdoor Unit

RAV-SM1100AT-E

No.	Parts name	Type	Specifications
1	Fan motor	ICF-140-63-2	Output (Rated) 63 W
		ICF-140-43-2	Output (Rated) 43 W
2	Compressor	DA220A2F-20L	3 phase, 4P, 2000 W
3	Reactor	CH-56	6 mH, 18.5 A
4	Outdoor temp. sensor (To-sensor)	—	10 kΩ at 25°C
5	Heat exchanger sensor (Te-sensor)	—	10 kΩ at 25°C
6	Suction temp. sensor (Ts-sensor)	—	10 kΩ at 25°C
7	Discharge temp. sensor (Td-sensor)	—	50 kΩ at 25°C
8	Fuse (Switching power (Protect))		T3.15 A, AC 250 V
9	Fuse (Inverter, input (Current protect)		25 A, AC 250 V
10	4-way valve solenoid coil	VHV-01AJ502E1	AC 220 – 240 V
11	Compressor thermo. (Protection)	US-622	ON : 90 ± 5°C, OFF : 125 ± 4°C

RAV-SM1400AT-E

No.	Parts name	Type	Specifications
1	Fan motor	ICF-140-63-2	Output (Rated) 63 W
2	Compressor	DA420A3F-21M	3 phase, 4P, 3500 W
3	Reactor	CH-56	6 mH, 18.5 A
4	Outdoor temp. sensor (To-sensor)	—	10 kΩ at 25°C
5	Heat exchanger sensor (Te-sensor)	—	10 kΩ at 25°C
6	Suction temp. sensor (Ts-sensor)	—	10 kΩ at 25°C
7	Discharge temp. sensor (Td-sensor)	—	50 kΩ at 25°C
8	Fuse (Switching power (Protect))		T3.15 A, AC 250 V
9	Fuse (Inverter, input (Current protect))		25 A, AC 250 V
10	4-way valve solenoid coil	VHV-01AJ502E1	AC 220 – 240 V
11	Compressor thermo. (Protection)	US-622	ON : 90 ± 5°C, OFF : 125 ± 4°C

5-3. Accessory Separate Sold Parts

RBC-U21PG (W) E (Ceiling panel)

No.	Parts name	Type	Specifications
1	Motor-louver	MP24GA	DC 12 V
2			

6. INDOOR CONTROL

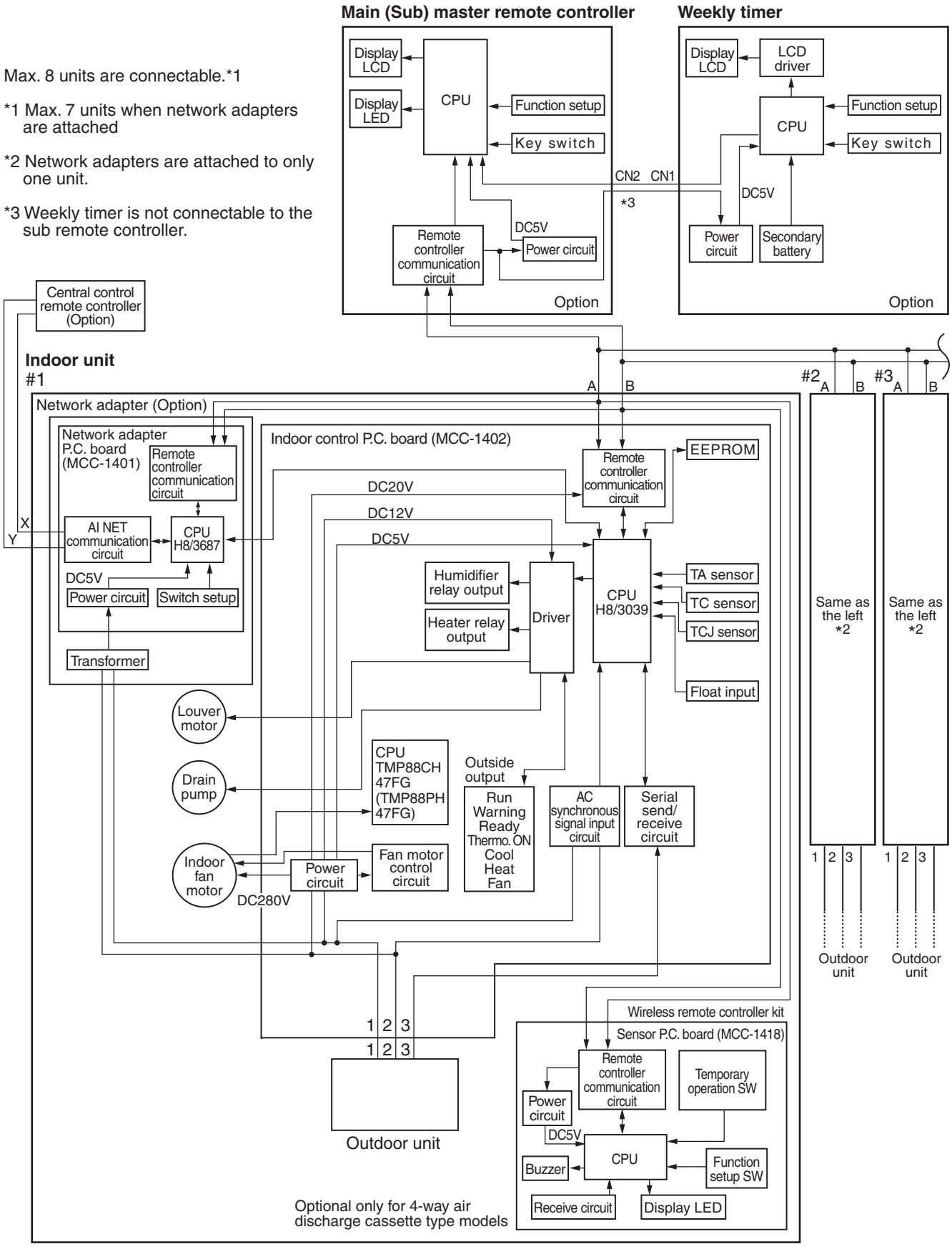
6-1. Indoor Control Circuit

Max. 8 units are connectable.*1

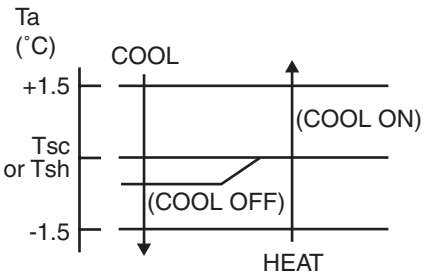
*1 Max. 7 units when network adapters are attached

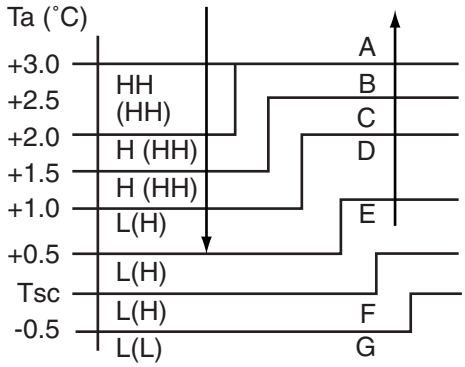
*2 Network adapters are attached to only one unit.

*3 Weekly timer is not connectable to the sub remote controller.

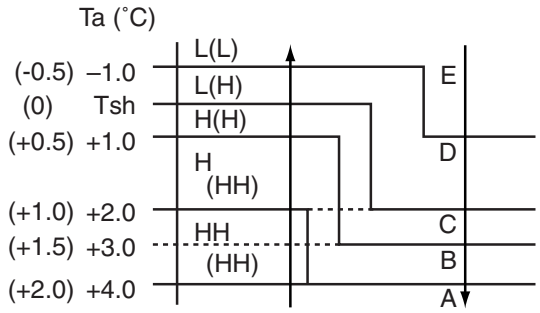


6-2. Control Specifications

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>1</td><td>When power supply is reset</td><td>1) Distinction of outdoor units
When the power supply is reset, the outdoors are distinguished, and control is exchanged according to the distinguished result.
2) Setting of speed of the indoor fan/setting whether to adjust air direction or not.
(Only 4-way models)
Based on EEPROM data, speed of the indoor fan or setting whether to adjust air direction or not is selected.</td><td>Air speed/
Air direction adjustment</td></tr>
<tr><td>2</td><td>Operation mode selection</td><td>1) Based on the operation mode selecting command from the remote controller, the operation mode is selected.
<table><tr><th>Remote controller command</th><th>Outline of control</th></tr><tr><td>STOP</td><td>Air conditioner stops.</td></tr><tr><td>FAN</td><td>Fan operation</td></tr><tr><td>COOL</td><td>Cooling operation</td></tr><tr><td>DRY</td><td>Dry operation</td></tr><tr><td>HEAT</td><td>Heating operation</td></tr><tr><td>AUTO</td><td>• COOL/HEAT operation mode is automatically selected by Ta and Ts for operation.</td></tr></table> 
1) Judge the selection of COOL/HEAT mode as shown in the figure above.
When 10 minutes passed after thermostat had been turned off, the heating operation (Thermo OFF) is exchanged to cooling operation if Tsh exceeds +1.5 or more.
(COOL OFF) and (COOL ON) in the figure indicate an example.
When 10 minutes passed after thermostat had been turned off, the cooling operation (Thermo OFF) is exchanged to heating operation if Tsc exceeds –1.5 or less.
2) For the automatic capacity control after judgment of COOL/HEAT, refer to item 4.
3) For the temperature correction of room temperature control in automatic heating operation, refer to item 3.</td><td>Ta : Room temperature
Ts : Setup temperature
Tsc : Setup temperature in cooling operation
Tsh : Setup temperature + Room temperature control temperature compensation</td></tr>
</table>

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>3</td><td>Room temperature control</td><td>1) Adjustment range Remote controller setup temperature (°C)
<table>
<tr><th></th><th>COOL/ DRY</th><th>Heating operation</th><th>Auto operation</th></tr>
<tr><td>Wired type</td><td>18 to 29</td><td>18 to 29</td><td>18 to 29</td></tr>
<tr><td>Wireless type*</td><td>18 to 30</td><td>16 to 30</td><td>17 to 27</td></tr>
</table>
* : Only for 4-way air discharge cassette type
2) Using the item code 06, the setup temperature in heating operation can be compensated.
<table>
<tr><td>Setup data</td><td>0</td><td>2</td><td>4</td><td>6</td></tr>
<tr><td>Setup temp. compensation</td><td>+0°C</td><td>+2°C</td><td>+4°C</td><td>+6°C</td></tr>
</table>
Setting at shipment
<table>
<tr><td>Setup data</td><td>2</td></tr>
</table></td><td>Shift of suction temperature in heating operation</td></tr>
<tr><td>4</td><td>Automatic capacity control (GA control)</td><td>1) Based on the difference between Ta and Ts, the operation frequency is instructed to the outdoor unit.</td><td></td></tr>
<tr><td>5</td><td>Air speed selection</td><td>1) Operation with (HH), (H), (L), or [AUTO] mode is performed by the command from the remote controller.
2) When the air speed mode [AUTO] is selected, the air speed varies by the difference between Ta and Ts.
<COOL>


• Controlling operation in case when thermo of remote controller works is same as a case when thermo of the body works.
• If the air speed has been changed once, it is not changed for 3 minutes. However when the air volume is exchanged, the air speed changes.
• When cooling operation has started, the air speed selects a downward slope, that is, the high position.
• If the temperature is just on the difference boundary, the air speed does not change.
• Mode in the parentheses indicates one in automatic cooling operation.</td><td>HH > H > L > LL</td></tr>
</table>

No.	Item	Outline of specifications	Remarks
5	Air speed selection (Continued)	**<HEAT>**  Value in the parentheses indicates one when thermostat of the remote controller works. Value without parentheses indicates one when thermostat of the body works. • If the air speed has been changed once, it is not changed for 1 minute. However when the air speed is exchanged, the air speed changes. • When heating operation has started, the air speed selects a upward slope, that is, the high position. • If the temperature is just on the difference boundary, the air speed does not change. • Mode in the parentheses indicates one in automatic heating operation. • In Tc ≥ 60°C, the air speed increases by 1 step. **<Operation of duct only>**	

Tap	Air volume setup		SM1100	SM1400
	COOL, DRY, FAN	HEAT	Revolutions per minute (rpm)	
F4		UH	530	660
F5		H	510	660
F6	H		500	620
F7	M+	M+	470	570
F8		M	450	520
F9	M		440	510
FA		L+	410	470
FB	L+	L	390	430
FC	L		380	420
FD		UL	320	370

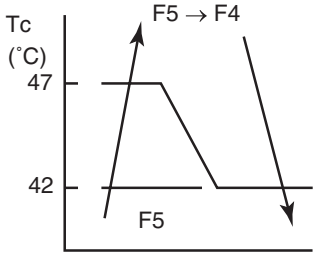
Tc: Indoor heat exchanger sensor temperature

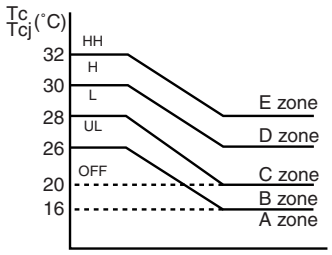
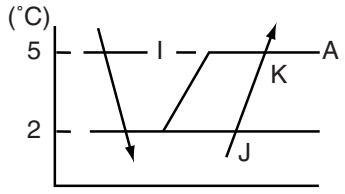
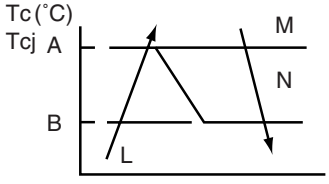
3) In heating operation, the mode changes to [UL] if thermostat is turned off.

[PRE-HEAT] display

4) If Ta ≥ 25°C when heating operation has started and when defrost operation has been cleared, it operates with HIGH (H) mode or (HH) for 1 minute from when Tc has entered in E zone of cool air discharge preventive control (Item 6).

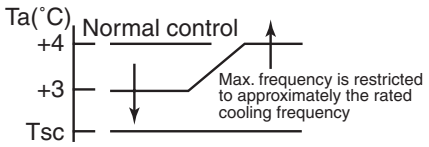
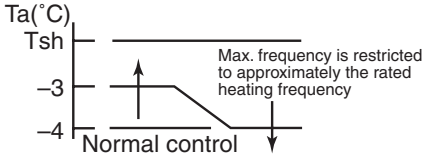
5) In automatic cooling/heating operation, the revolution frequency of [HH] is set larger than that in the standard cooling/heating operation. However the revolution frequency is restricted in the automatic heating operation as shown in the following figure.



No.	Item	Outline of specifications	Remarks
6	Cool air discharge preventive control	1) In heating operation, the indoor fan is controlled based on the detected temperature of Tc sensor or Tcj sensor. As shown below, the upper limit of the revolution frequency is determined. 	In D or E zone, the priority is given to setup of air volume exchange. In A and B zones, [PRE-HEAT] is displayed.
7	Freeze preventive control (Low temperature release)	1) The cooling operation (including Dry operation) is performed as follows based on the detected temperature of Tc sensor or Tcj sensor. When [J] zone is detected for 6 minutes (Following figure), the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [J] zone. In [K] zone, time counting is interrupted and the operation is held. When [I] zone is detected, the timer is cleared and the operation returns to the normal operation. If the commanded frequency becomes S0 because the operation continues in [J] zone, the return temperature A is raised from 5°C to 12°C until [I] zone is detected and the indoor fan operates with [M] mode.  In heating operation, the freeze-preventive control works if 4-way valve is not exchanged and the condition is satisfied. (However the temperature for J zone dashing control is changed from 2°C to –5°C.)	Tcj : Indoor heat exchanger sensor temperature
8	High-temp release control	1) The heating operation is performed as follows based on the detected temperature of Tc sensor or Tcj sensor. • When [M] zone is detected, the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [M] zone. • In [N] zone, the commanded frequency is held. • When [L] zone is detected, the commanded frequency is returned to the original value by approx. 6Hz every 60 seconds. Setup at shipment **Control temp (°C)** A: 56 (54) B: 52 (52)  **NOTE :** When the operation has started or when Tc or Tcj became lower than 30°C after start of the operation, temperature is controlled between values in parentheses of A and B.	Same when thermostat is turned off.

No.	Item	Outline of specifications	Remarks
9	Drain pump control (For the duct, when the drain-up kit (sold separately) is mounted)	1) In cooling operation (including Dry operation), the drain pump is usually operated. 2) If the float switch operates while drain pump operates, the compressor stops, the drain pump continues the operation, and a check code is output. 3) If the float switch operates while drain pump stops, the compressor stops and the drain pump operates. If the float switch keeps operating for approx. 4 minutes, a check code is output.	Check code [P10]
10	After-heat elimination	When heating operation stops, the indoor fan operates with LOW mode for approx. 30 seconds.	
11	Flap control (For 4-way air discharge cassette type only)	1) Flap position setup • When the flap position is changed, the position moves necessarily to downward discharge position once to return to the set position. • The flap position can be set up in the following operation range. **In cooling/dry operation** **In heating/fan operation** • In group twin/triple operation, the flap positions can be set up collectively or individually. 2) Swing setup • The swinging position can be moved in the following operation range. **All modes** • In group twin/triple operation, the swinging positions can be set up collectively or individually. 3) When the unit stops or when a warning is output, the flap automatically moves downward. 4) While the heating operation is ready, the flap automatically moves upward.	**Warning :** A check code is displayed on the remote controller, and the indoor unit stops. (Excluding [F08] and [L31])

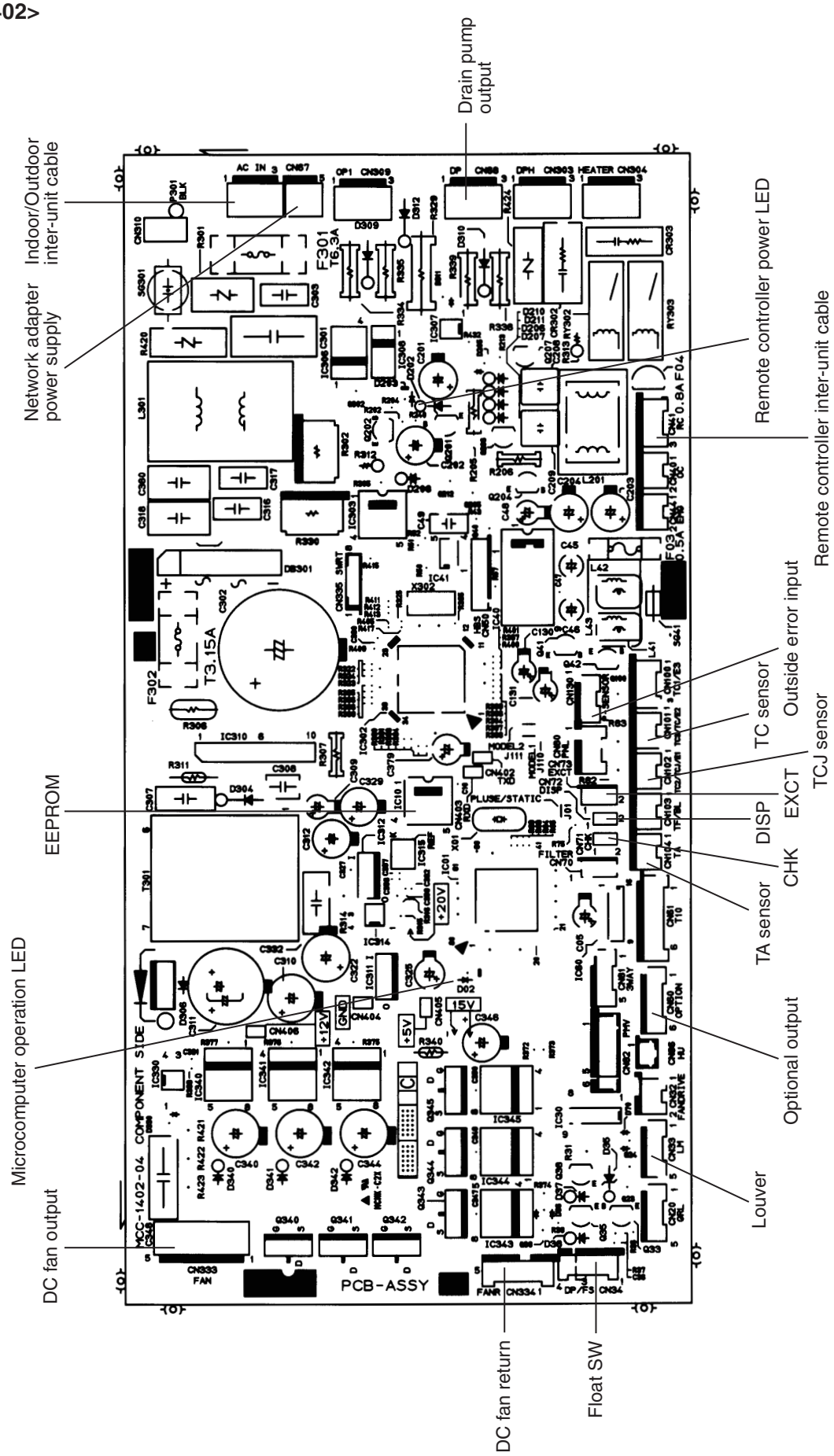
No.	Item	Outline of specifications	Remarks
12	Frequency fixed operation (Test run)	**<In case of wired remote controller>** 1. When pushing [CHECK] button for 4 seconds or more, [TEST] is displayed on the display screen and the mode enters in Test run mode. 2. Push [ON/OFF] button. 3. Using [MODE] button, change the mode from [COOL] to [HEAT]. • Do not use other mode than [COOL]/[HEAT] mode. • During test run operation, the temperature cannot be adjusted. • An error is detected as usual. • A frequency fixed operation is performed. 4. After the test run, push [ON/OFF] button to stop the operation. (Display in the display part is same as the procedure in item 1).) 5. Push [CHECK] button to clear the test run mode. ([TEST] display in the display part disappears and the status returns to the normal stop status.) **<In case of wireless remote controller> (Option for 4-way air discharge cassette type only)** 1. Turn off the power of the set. Remove the adjuster with sensors from the ceiling panel. 2. Turn Bit [1: TEST] of sensor P.C. board switch [S003] from OFF to ON. Attach the sensor P.C. board cover and mount the adjuster with sensors to the ceiling panel. Turn on the power of the set. 3. Push [ON/OFF] button of the wireless remote controller and set the operation mode to [COOL] or [HEAT] using [MODE] button. (During test run operation, all the display lamps of wireless remote controller sensors flash.) • Do not use other mode than [COOL]/[HEAT] mode. • An error is detected as usual. • A frequency fixed operation is performed. 4. After the test run, push [ON/OFF] button to stop the operation. 5. Turn off the power of the set. Turn Bit [1: TEST] of sensor P.C. board switch [S003] from ON to OFF. Mount the adjuster with sensors to the ceiling panel.	
13	Filter sign display (Except wireless type)	1) The operation time of the indoor fan is calculated, the filter reset signal is sent to the remote controller when the specified time (2500H) has passed, and it is displayed on LCD. 2) When the filter reset signal has been received from the remote controller, time of the calculation timer is cleared. In this case, the measurement time is reset if the specified time has passed, and display on LCD disappears.	[FILTER] goes on.

No.	Item	Outline of specifications	Remarks
14	Central control mode selection	1) Setting at the central controller side enables to select the contents which can be operated on the remote controller at indoor unit side. 2) **RBC-AMT21** **[Last push priority] :** The operation contents can be selected from both remote controller and central controller of the indoor unit side, and the operation is performed with the contents selected at the last. **[Center] :** Start/Stop operation only can be handled on the remote controller at indoor unit side. **[Operation Prohibited] :** It cannot be operated on the remote controller at indoor unit side. (Stop status is held.)	(No display) [CENTER] goes on. [CENTER] goes on. In a case of wireless type, the display lamp does not change. However, contents which can be operated are same. The status set in [CENTER]/ [Operation Prohibited] mode is notified with the receiving sound "Pi, Pi, Pi, Pi, Pi" (5 times).
15	Energy-save control (By connected outdoor unit)	1) Selecting [AUTO] mode enables an energy-saving to be operated. 2) The setup temperature is shifted (corrected) in the range not to lose the comfort ability according to input values of various sensors. 3) Data (Input value room temp. Ta, Outside temp. To, Air volume, Indoor heat exchanger sensor temp. Tc) for 20 minutes are taken the average to calculate correction value of the setup temperature. 4) The setup temperature is shifted every 20 minutes, and the shifted range is as follows. In cooling time : +1.5 to –1.0K In heating time : –1.5 to +1.0K	
	Max. frequency cut control	1) This control is operated by selecting [AUTO] operation mode. 2) COOL operation mode: the frequency is controlled according to the following figure if To < 28°C.  3) HEAT operation mode: the frequency is controlled according to the right figure if To > 15°C. 	
	DC motor (For 4-way air discharge cassette type only)	1) When the fan operation has started, positioning of the stator and the rotor are performed. (Moves slightly with tap sound) 2) The motor operates according to the command from the indoor controller. **NOTES :** • When the fan rotates while the air conditioner stops due to entering of outside air, etc, the air conditioner may operated while the fan motor stops. • When a fan locking is found, the air conditioner stops, and an error is displayed.	Check code [P12]

6-3. Indoor Print Circuit Board

RAV-SM1100UT-E/RAV-SM1400UT-E

<MCC-1402>



6-4. Indoor P.C. Board Optional Connector Specifications

Function	Connector No.	Pin No.	Specifications	Remarks
Option output	CN60	1	DC12V (COM)	
		2	Defrost output	ON during defrost operation of outdoor unit
		3	Thermo. ON output	ON during Real thermo-ON (Comp ON)
		4	Cooling output	ON when operation mode is in cooling system (COOL, DRY, COOL in AUTO cooling/heating)
		5	Heating output	ON when operation mode is in heating system (HEAT, HEAT in AUTO cooling/heating)
		6	Fan output	ON during indoor fan ON (Air purifier is used/Interlock cable)
Outside error input	CN80	1	DC12V (COM)	(When continued for 1 minute) Check code “L30” is output and forced operation stops.
		2	DC12V (COM)	
		3	Outside error input	
Filter option error	CN70	1	Filter/Option/Humidifier setup input	Option error input is controlled. (Protective operation for device attached to outside is displayed.)
		2	0V	* Setting of option error input is performed from remote controller. (DN=2A)
CHK Operation check	CN71	1	Check mode input	Used for operation check of indoor unit. (Communication with outdoor unit or remote controller is not performed, but the specified operation such as indoor fan “H” or drain pump ON is output.)
		2	0V	
DISP display mode	CN72	1	Display mode input	Display mode enables indoor unit and remote controller to communicate. (When power is turned on)
		2	0V	
EXCT demand	CN73	1	Demand input	Forced thermo-OFF operation in indoor unit
		2	0V	

7. OUTDOOR CONTROL

7-1. Outline of Main Controls

1. Pulse Modulating Valve (PMV) control

1) For PMV, SM1100 is controlled with 45 to 500 pulses and SM1400 with 50 to 500 pulses during operation, respectively.
2) In cooling operation, PMV is controlled with the temperature difference between TS sensor and TC sensor.
3) In heating operation, PMV is controlled with the temperature difference between TS sensor and TE sensor.
4) For the temperature difference in items 2) and 3), 1 to 5K is aimed as the target in both cooling and heating operations.
5) When the cycle excessively rose in both cooling and heating operations, PMV is controlled by TD sensor. The aimed value is usually 105°C for SM1100 and 100°C for SM1400 in both cooling and heating operations.

REQUIREMENT

A sensor trouble may cause a liquid back-flow or abnormal overheat resulting in excessive shortening of the compressor life. In a case of trouble on the compressor, be sure to check there is no error in the resistance value an the refrigerating cycle of each sensor after repair and then start the operation.

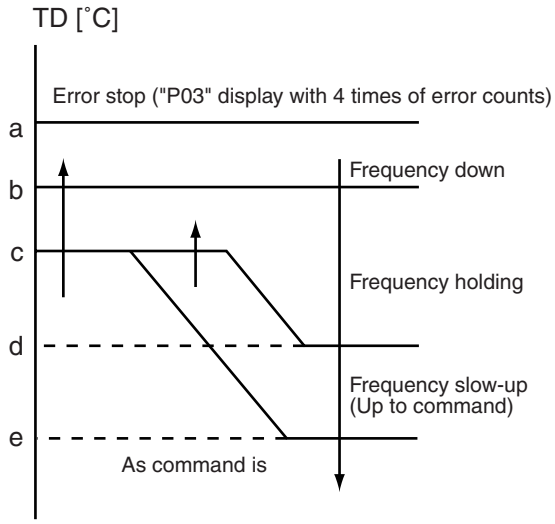
2. Discharge temperature release control

1) This function controls the operation frequency, that is, lowers the operation frequency when the discharge temperature has not lower or the discharge temperature has rapidly risen during PMV control. It subdivides the frequency control up to a unit of 0.6Hz to stabilize the cycle.
2) When the discharge temperature is detected in an abnormal stop zone, the unit stops the compressor and restarts after 2 minutes 30 seconds. The error counter is cleared when it has continued the operation for 10 minutes. If the abnormal stop zone has been detected by 4 times without clearing of counter, an error 'P03' is displayed.

* The cause is considered as excessively little amount of refrigerant, defective PMV, or clogging of cycle.

[°C]

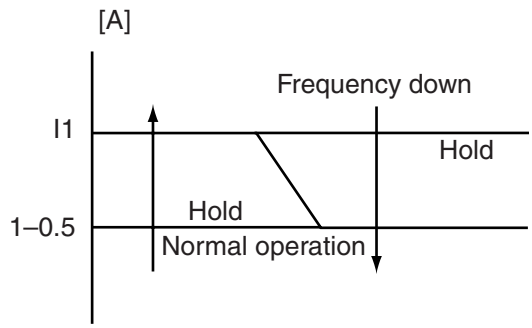
	a	b	c	d	e
SM1100 SM1400	111	106	100	95	90



3. Current release control

The output frequency and the output voltage are controlled by AC current value detected by T02 on the outdoor P.C. board so that input current of the inverter does not exceed the specified value.

Objective model	SM1100		SM1400	
	COOL	HEAT	COOL	HEAT
I1 value [A]	18.90	19.65	19.65	19.65



4. Outdoor fan control

Allocautions of fan tap revolutions [rpm]

		W1	W2	W3	W4	W5	W6	W7	W8	W9	WA	WB	WC	WD	WE
SM1100	Upper fan	250	280	300	320	340	380	420	470	520	570	630	690	740	800
	Lower fan	OFF	OFF	270	290	400	480	520	560	600	660	720	780	860	940
SM1400	Upper fan	250	270	270	300	350	410	470	530	590	670	750	810	840	860
	Lower fan	OFF	OFF	240	270	330	390	450	510	570	650	730	790	820	840

1) Cooling fan control

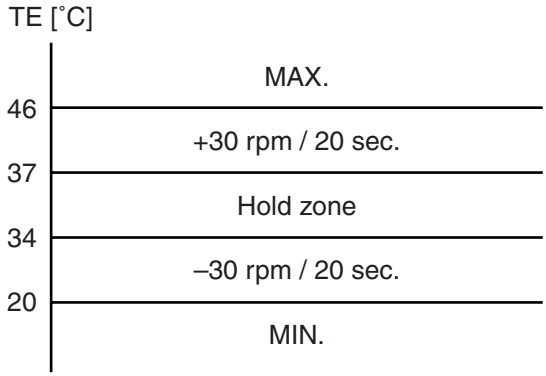
① The outdoor fan is controlled by TE sensor. (Cooling: Temperature conditions after medium term)

The cooling fan is controlled by every 1 tap of DC fan control (14 taps).

② At the activation time, although the maximum fan tap in the following table are fixed for 60 seconds, after then the fan may not rotate with high speed for several minutes because the fan is controlled by TE sensor value. It is not an abnormal status.

③ When the discharge temperature sensor is abnormal or the sensor comes off the holder, the fan does not rotate with high speed, but a protective device works.

④ When the outdoor fan does not rotate with high speed, judge a fan error by comparing the control data in the following table with TO and TE values.



Control for fan tap by outdoor temperature in normal operation

TO	TO < 5°C	5 ≤ TO <10°C	10 ≤ TO < 15°C	15 ≤ TO < 20°C	20 ≤ TO < 25°C	25°C ≤ TO	TO error
MIN	W1	W2	W3	W4	W5	WA	W1
MAX	W6	W8	WA	WC	WE	WE	WE

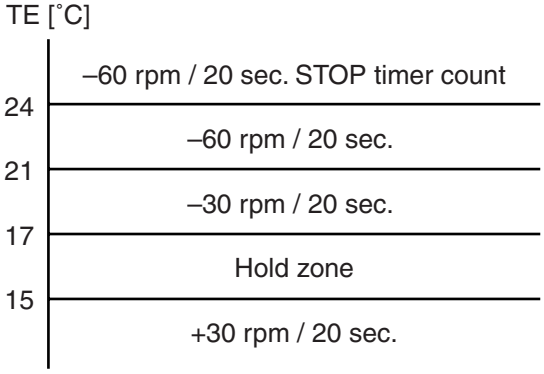
2) Heating fan control

① This control function lowers fan tap according to TE sensor value when outdoor temperature is high.

② When a status TE > 20°C is detected continuously for 5 minutes, the operation may stop. This status does not output an error code and is assumed as usual status of thermo-OFF. The fan restarts after approx. 2 minutes 30 seconds and this intermittent operation is not a trouble.

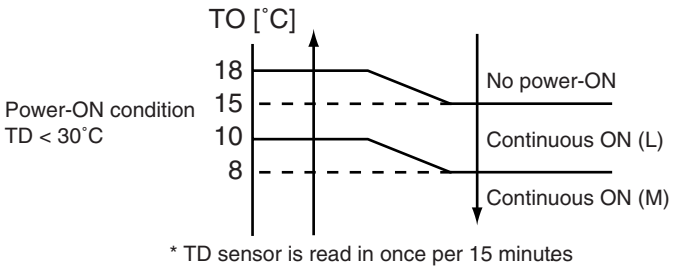
③ If the status in item ② is frequently found, it is considered that the filter of suction part of the indoor unit is dirty. Clean the filter and restart the operation.

④ This control function does not work for 30 minutes after activation, 1 minute after defrosting, and during defrost operation.



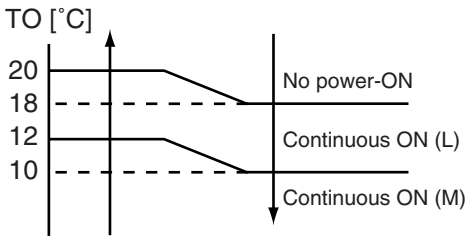
5. Coil heating control

1) This control function heats the compressor by turning on the stopped compressor instead of a case heater. It purposes to prevent slackness of the refrigerant inside of the compressor.
2) As usual, turn on power of the compressor for the specified time before a test run after installation, otherwise a trouble of the compressor may be caused. As same as a test run, it is recommended to turn on power of the compressor beforehand when starting operation after power of the compressor has been interrupted for a long time.
3) A judgment for electricity is performed by TD and TO sensors. If TO sensor is defective, a backup control is automatically performed by TE sensor. For a case of defective TO sensor, judge it with the outdoor LED display.
4) Coil heating is controlled by TD and TE sensor.
5) For every model, the power is turned off when TD is 30°C or more.



* TD sensor is read in once per 15 minutes

(In trouble of sensor)



	SM1100	SM1400
L	20W and equivalent	25W and equivalent
M	40W and equivalent	50W and equivalent

NOTIFICATION

It is not an abnormal phenomenon that electro-noise may be heard while heating the coil.

6. Short intermittent operation preventive control

① The compressor may not stop for preventing the compressor for 3 to 10 minutes after start of the operation even if Thermo-OFF signal has been received from the indoor. This phenomenon is not abnormal. (Continuous operation time of the compressor differs according to the operating status.)

② If the equipment is stopped from the remote controller, the operation does not continue.

7. High-pressure suppression TE control

① This control suppresses that pressure becomes abnormally higher during cooling operation.

② Stop the compressor under condition of TE ≥ 67°C, and count 1 on the error count.

③ After 2 minutes 30 seconds passed, if TE < 67°C, the compressor restarts and the error count is cleared when the operation continues for 10 minutes.

④ When TE ≥ 67°C is detected again within 10 minutes, 1 is added to the error count and restart is repeated.

⑤ If the error counts 10 are recognized, it is determined as an error and restart is not performed. Error code 'P04' is displayed.

⑥ After restarting the compressor, continue controlling by using 70% to 90% of the control value of the current release control for minimum 30 minutes.

8. Over-current preventive control

① This control function stops the compressor when over-current preventive circuit has detected an abnormal current.

② The compressor restarts with error count 1 after 2 minutes 30 seconds.

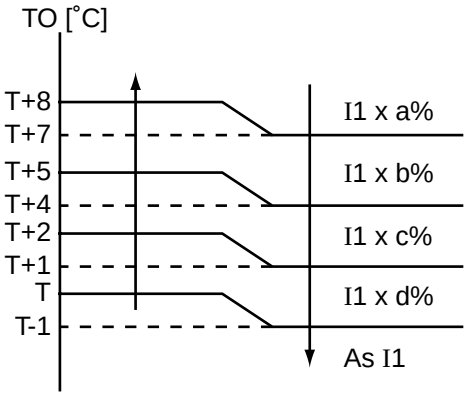
③ If the error counts 4 are recognized, it is determined as an error and restart is not performed. Error code 'H01', 'H02' or 'P26' is displayed.

9. Current release value shift control

① This control function prevents troubles of the electron parts such as G-Tr of inverter of compressor drive system and troubles of the compressor during cooling operation.

② This control function corrects the current release control value (I1) in item 3 of 7-1. by Current release control.

③ The value to be corrected is based upon the following control diagram and correction value table.



Corrected value

	T	a	b	c	d
SM1100	39°C	50%	70%	80%	90%
SM1400	39°C	70%	80%	90%	95%

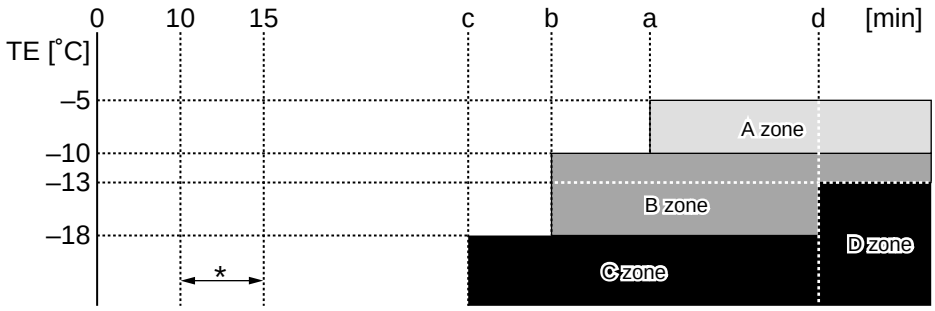
10. Defrost control

① In heating operation, defrost operation is performed when TE sensor temperature satisfies any condition in A zone to D zone.

② The defrost operation is immediately finished if TE sensor temperature has become 12°C or more, or it also is finished when condition of 7°C ≤ TE < 12°C has continued for 1 minute. The defrost operation is also finished when defrost operation has continued for 10 minutes even if TE sensor temperature has become 7°C or lower.

③ After defrost operation has finished, the compressor and the outdoor fan start heating operation after stopped for approx. 50 seconds.

Start of heating operation



* The minimum TE value between 10 and 15 minutes after heating operation has started is stored in memory as TE0.

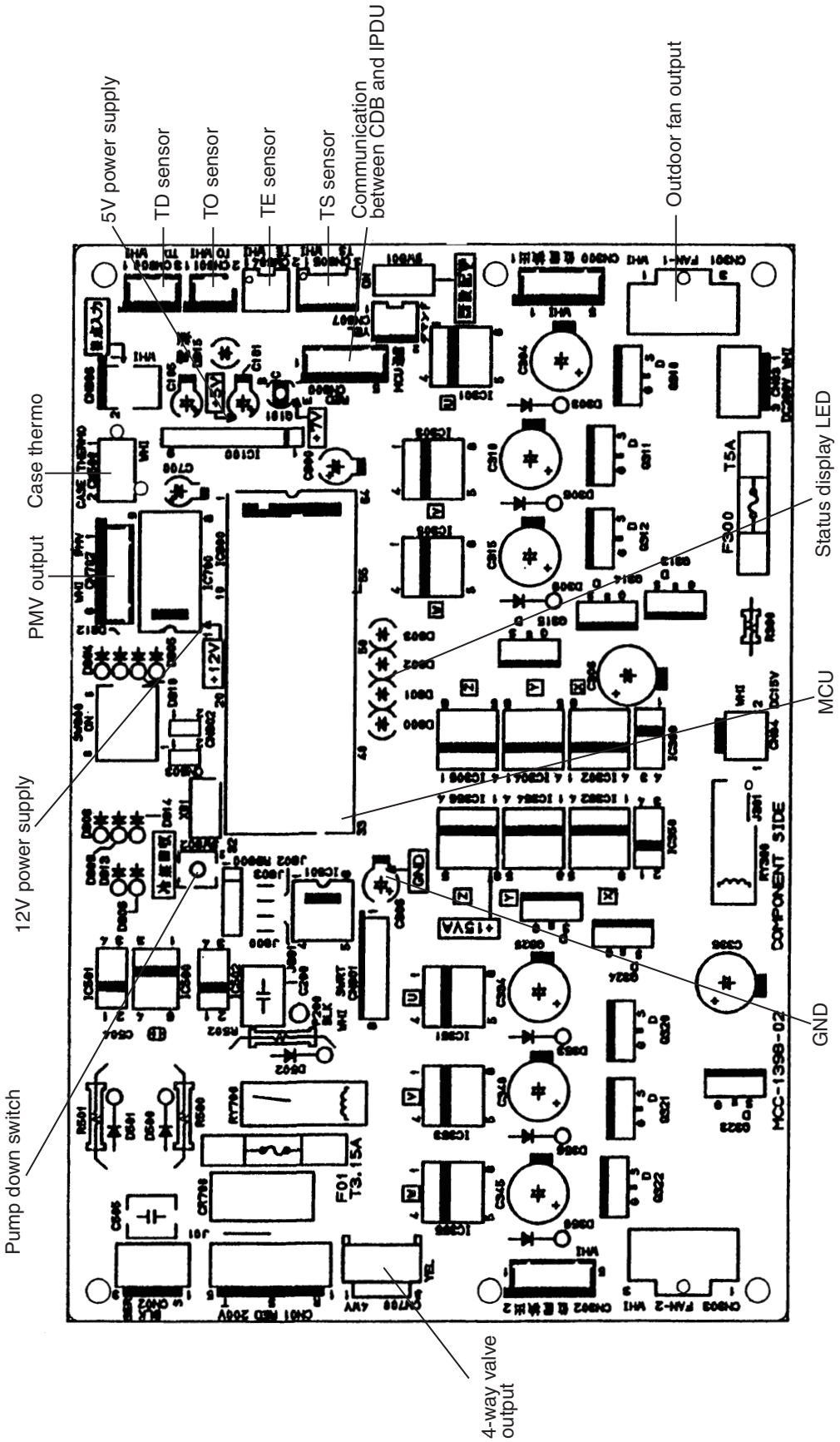
A zone	Defrost operation is performed in this zone when TE0-TE ≥ 3 continued for T seconds.
B zone	Defrost operation is performed in this zone when TE0-TE ≥ 3 continued for T seconds.
C zone	Defrost operation is performed when this zone continued for T seconds.
D zone	Defrost operation is performed when this zone continued for T seconds.

	SM1100, SM1400
a	34
b	40
c	55
d	90
T	20

7-2. Print Circuit Board

<Viewed from parts of P.C board>

MCC-1398



8. TROUBLESHOOTING

8-1. Summary of Troubleshooting

<Wired remote controller type>

1. Before troubleshooting

1) Required tools/instruments
   - ⊕ and ⊖ screwdrivers, spanners, radio cutting pliers, nippers, push pins for reset switch
   - Tester, thermometer, pressure gauge, etc.

2) Confirmation points before check

① The following operations are normal.

a) Compressor does not operate.
   - Is not 3-minutes delay (3 minutes after compressor OFF)?
   - Does not thermostat turn off?
   - Does not timer operate during fan operation?
   - Is not outside high-temperature operation controlled in heating operation?

b) Indoor fan does not rotate.
   - Does not cool air discharge preventive control work in heating operation?

c) Outdoor fan does not rotate or air volume changes.
   - Does not high-temperature release operation control work in heating operation?
   - Does not outside low-temperature operation control work in cooling operation?
   - Is not defrost operation performed?

d) ON/OFF operation cannot be performed from remote controller.
   - Is not the control operation performed from outside/remote side?
   - Is not automatic address being set up?
     (When the power is turned on at the first time or when indoor unit address setting is changed, the operation cannot be performed for maximum approx. 5 minutes after power-ON.)

② Did you return the cabling to the initial positions?

③ Are connecting cables of indoor unit and remote controller correct?

(2) Troubleshooting procedure

When a trouble occurred, check the parts along with the following procedure.

Trouble → **Confirmation of check code display** → **Check defective position and parts.**

NOTE :
For cause of a trouble, power conditions or malfunction/erroneous diagnosis of microcomputer due to outer noise is considered except the items to be checked. If there is any noise source, change the cables of the remote controller to shield cables.

<Wireless remote controller type> (Only for 4-way air discharge cassette type models)

1. Before troubleshooting

1) Required tools/instruments
   - ⊕ and ⊖ screwdrivers, spanners, radio cutting pliers, nippers, etc.
   - Tester, thermometer, pressure gauge, etc.

2) Confirmation points before check
   ① The following operations are normal.
   a) Compressor does not operate.
      - Is not 3-minutes delay (3 minutes after compressor OFF)?
      - Does not thermostat turn off?
      - Does not timer operate during fan operation?
      - Is not outside high-temperature operation controlled in heating operation?

   b) Indoor fan does not rotate.
      - Does not cool air discharge preventive control work in heating operation?

3) Outdoor fan does not rotate or air volume changes.
   - Does not high-temperature release operation control work in heating operation?
   - Does not outside low-temperature operation control work in cooling operation?
   - Is not defrost operation performed?

4) ON/OFF operation cannot be performed from remote controller.
   - Is not forced operation performed?
   - Is not the control operation performed from outside/remote side?
   - Is not automatic address being set up?

   ① Did you return the cabling to the initial positions?
   ② Are connecting cables between indoor unit and receiving unit correct?

2. Troubleshooting procedure

(When the power is turned on at the first time or when indoor unit address setting is changed, the operation cannot be performed for maximum approx. 5 minutes after power-ON.)

When a trouble occurred, check the parts along with the following procedure.

1) Outline of judgment

   The primary judgment to check where a trouble occurred in indoor unit or outdoor unit is performed with the following method.

Method to judge the erroneous position by flashing indication on the display part of indoor unit (sensors of the receiving unit)

The indoor unit monitors operating status of the air conditioner, and the blocked contents of self-diagnosis are displayed restricted to the following cases if a protective circuit works.

8-2. Check Code List

Error mode detected by indoor unit

◎ : Flash, ○ : Go on, ● : Go off

Wireless sensor lamp display			Wired remote controller	Diagnostic function			Judgment and measures
Operation	Timer	Ready	Check code	Cause of operation	Status of air conditioner	Condition	
◎	●	●	E03	No communication from remote controller (including wireless) and communication adapters	Stop (Automatic reset)	Displayed when error is detected	1. Check cables of remote controller and communication adapters. • Handy remote controller LCD display OFF (Disconnection) • Central remote controller [97] check code
●	●	◎	E04	The serial signal is not output from outdoor unit to indoor unit. • Miscabling of inter-unit cables • Defective serial sensing circuit on outdoor P.C. board • Defective serial receiving circuit on indoor P.C. board	S top (Automatic reset)	Displayed when error is detected	1. Outdoor unit does not completely operate. • Inter-unit cable check, correction of miscabling, case thermo operation • Outdoor P.C. board check, P.C. board cables check 2. In normal operation P.C. board (Indoor receiving/Outdoor sending) check
◎	●	●	E08	Duplicated indoor unit addresses	Stop	Displayed when error is detected	1. Check whether there is modification of remote controller connection (Group/ Individual) or not after power has been turned on (finish of group configuration/ address check). * If group configuration and address are not normal when the power has been turned on, the mode automatically shifts to address setup mode. (Resetting of address)
◎	●	◎	L03	Duplicated indoor master units			
◎	●	◎	L07	There is group line in individual indoor units.			
◎	●	◎	L08	Unsetting of indoor group address			
◎	●	◎	L09	Unset indoor capacity	Stop	Displayed when error is detected	1. Set the indoor capacity. (DN=I1)
◎	○	◎	L30	Abnormal outside interlock input	Stop	Displayed when error is detected	1. Check outside devices. 2. Check indoor P.C. board.
●	◎	◎	P01	Fan motor thermal protection	Stop	Displayed when error is detected	1. Check thermal relay of fan motor. 2. Check indoor P.C. board.
●	◎	◎	P10	Float switch operation • Disconnection, coming-off, defective float switch contactor of float circuit	Stop	Displayed when error is detected	1. Defect of drain pump 2. Clogging of drain pump 3. Check float switch. 4. Check indoor P.C. board.
●	◎	◎	P12	Indoor DC fan error	Stop	Displayed when error is detected	1. Defective detection of position 2. Over-current protective circuit of indoor fan driving unit operates. 3. Lock of indoor fan 4. Check indoor P.C. board.
◎	●	◎	P19	Error in 4-way valve system • Indoor heat exchanger temperature lowered after start of heating operation.	Stop (Automatic reset)	Displayed when error is detected	1. Check 4-way valve. 2. Check indoor heat exchanger (TC/TCJ) sensor. 3. Check indoor P.C. board.
◎	●	◎	P31	Own unit stops while warning is output to other indoor units.	Stop (Sub unit) (Automatic reset)	Displayed when error is detected	1. Judge sub unit while master unit is in [E03], [L03], [L07], [L08]. 2. Check indoor P.C. board.
◎	◎	●	F01	Coming-off, disconnection or short of indoor heat exchanger sensor (TCJ)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temperature sensor (TCJ). 2. Check indoor P.C. board.
◎	◎	●	F02	Coming-off, disconnection or short of indoor heat exchanger sensor (TC)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temperature sensor (TC). 2. Check indoor P.C. board.
◎	◎	●	F10	Coming-off, disconnection or short of indoor heat exchanger sensor (TA)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temperature sensor (TA). 2. Check indoor P.C. board.
◎	◎	●	F29	Indoor EEPROM error • EEPROM access error	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor EEPROM. (including socket insertion) 2. Check indoor P.C. board.
◎	●	●	E10	Communication error between indoor MCU • Communication error between fan driving MCU and main MCU	Stop (Automatic reset)	Displayed when error is detected	1. Check cables of remote controller. 2. Check power cables of indoor unit. 3. Check indoor P.C. board.
◎	●	●	E18	Regular communication error between master and sub indoor units or between main and sub indoor units	Stop (Automatic reset)	Displayed when error is detected	1. Check cables of remote controller. 2. Check indoor power cable. 3. Check indoor P.C. board.

Error mode detected by outdoor unit

◎ : Flash, ○ : Go on, ● : Go off

Wireless sensor lamp display			Wired remote controller	Diagnostic function			Judgment and measures
Operation	Timer	Ready	Check code	Cause of operation	Status of air conditioner	Condition	
●	◎	●	H01	Breakdown of compressor • Displayed when error is detected	Stop	Displayed when error is detected	1. Check power voltage. AC200V±20V 2. Overload operation of refrigerating cycle 3. Check current detection circuit at AC side.
●	◎	●	H02	Compressor does not rotate. • Over-current protective circuit operates after specified time passed when compressor had been activated.	Stop	Displayed when error is detected	1. Trouble of compressor (Compressor lock, etc.) : Replace compressor. 2. Defective cabling of compressor (Phase missing) 3. Phase-missing operation of power supply (3-phase model)
●	◎	●	H03	Current detection circuit error • Current value at AC side is high even during compressor-OFF. • Phase of power supply is missed.	Stop	Displayed when error is detected	1. Compressor immediately stops even if restarted. : Check IPDU. 2. Phase-missing operation of power supply Check 3-phase power voltage and cables.
◎	○	◎	L29	Outdoor unit and other errors • Communication error between CDB and IPDU (Coming-off of connector) • Heat sink temperature error (Detection of temperature over specified value)	Stop	Displayed when error is detected	1. Check cables of CDB and IPDU. 2. Abnormal overload operation of refrigerating cycle
◎	○	◎	L31	Phase detection protective circuit operates. (Normal models)	Operation continues. (Compressor stops.)	Displayed when error is detected	1. Check power phase order (Reversed phase)/phase missing. 2. Check outdoor P.C. board.
◎	●	◎	P03	Discharge temperature error • Discharge temperature over specified value was detected.	Stop	Displayed when error is detected	1. Check refrigerating cycle. (Gas leak) 2. Trouble of PMV 3. Check Td sensor.
◎	●	◎	P04	High-pressure protection error by TE sensor (Temperature over specified value was detected.)	Stop	Displayed when error is detected	1. Overload operation of refrigerating cycle 2. Check outdoor temperature sensor (TE). 3. Check outdoor CDB P.C. board.
◎	●	◎	P22	Outdoor DC fan error	Stop	Displayed when error is detected	1. Defective detection of position 2. Over-current protective circuit of outdoor fan driving unit operates. 3. Lock of outdoor fan 4. Check outdoor CDB P.C. board.
◎	●	◎	P26	Inverter over-current protective circuit operates. (For a short time) Short voltage of main circuit operates.	Stop	Displayed when error is detected	1. Inverter immediately stops even if restarted. : Compressor motor rare short 2. Check IPDU. : Cabling error
◎	●	◎	P29	IPDU position detection circuit error	Stop	Displayed when error is detected	1. Position detection circuit operates even if operating compressor by removing 3P connector. : Replace IPDU.
◎	◎	○	F04	Coming-off, disconnection or short of outdoor temperature sensor (TD)	Stop	Displayed when error is detected	1. Check outdoor temperature sensor (TD). 2. Check outdoor CDB P.C. board.
◎	◎	○	F06	Coming-off, disconnection or short of outdoor temperature sensor (TE/TS)	Stop	Displayed when error is detected	1. Check outdoor temperature sensor (TE/TS). 2. Check outdoor CDB P.C. board.
◎	◎	○	F08	Coming-off, disconnection or short of outdoor temperature sensor (TO)	Operation continues.	Displayed when error is detected	1. Check outdoor temperature sensor (TO). 2. Check outdoor CDB P.C. board.

For an error mode detected in outdoor unit, the fan operates because sub unit of a group operation does not communicate with the outdoor unit.

Error mode detected by remote controller or network adapter

◎ : Flash, ○ : Go on, ● : Go off

Wireless sensor lamp display			Wired remote controller	Diagnostic function			Judgment and measures
Operation	Timer	Ready	Check code	Cause of operation	Status of air conditioner	Condition	
—	—	—	No check code is displayed. (Remote controller does not operate.)	No communication with master indoor unit • Remote controller cable is not correctly connected. • Power of indoor unit is not turned on. • Automatic address cannot be completed.	Stop	—	Remote controller power error, Defective indoor EEPROM 1. Check remote controller inter-unit cables. 2. Check remote controller. 3. Check indoor power cables. 4. Check indoor P.C. board. 5. Check indoor EEPROM. (including socket insertion) : Phenomenon of automatic address repetition occurred.
◎	●	●	E01*2	No communication with indoor master unit • Disconnection of inter-unit cable between remote controller and master indoor unit (Detected at remote controller side)	Stop (Automatic restart) * When there is center, operation continues.	Displayed when error is detected	Signal receiving of remote controller is defective. 1. Check remote controller inter-unit cables. 2. Check remote controller. 3. Check indoor power cables. 4. Check indoor P.C. board.
◎	●	●	E02	Signal sending error to indoor unit (Detected at remote controller side)	Stop (Automatic restart) * When there is center, operation continues.	Displayed when error is detected	Signal sending of remote controller is defective. 1. Check sending circuit inside of remote controller. : Replace remote controller.
◎	●	●	E09	Multiple master remote controllers are recognized. (Detected at remote controller side)	Stop (Sub unit continues operation.)	Displayed when error is detected	1. Check there are multiple master units for 2 remote controllers (including wireless). : Master unit is one and others are sub units.
◎	○	◎	L20 Central remote controller 98	Duplicated indoor central addresses on communication of central control system (AI-NET) (Detected by central controller side)	Stop (Automatic restart)	Displayed when error is detected	1. Check address setup of central control system network. (Network adapter SW01) 2. Check network adapter P.C. board.
—	—	—	— *3 Central remote controller 99	Multiple network adapters on remote controller communication line (Detected by central controller side)	Operation continues.	Displayed when error is detected	1. Check multiple network adapters. 2. Check inter-unit cable/miscabling of remote controller. : Only one network adapter on remote controller communication line
—	—	—	— *3 Central remote controller 97	Interruption of central control system (AI-NET) communication circuit (Detected by central controller side)	Operation continues. (According to handy remote controller)	Displayed when error is detected	1. Check communication line/miscabling. Check power of indoor unit. 2. Check communication. (XY terminals) 3. Check network adapter P.C. board. 4. Check central controller (such as central control remote controller, etc.).
—	—	—	— Central remote controller b7	Indoor Gr sub unit error (Detected by central controller side)	Continuation/stop (Based on a case)	Displayed when error is detected	Check the check code of corresponding unit by handy remote controller.

*2 Check code is not displayed by wired remote controller. (Usual operation of air conditioner is disabled.)
For wireless type models, E01 is notified by the display lamp.

*3 These errors are related to communication of remote controllers (A, B) and central system (AI-NET, X, Y), and [E01], [E02], [E03], [E09], or [E18] is displayed or no check code is displayed on the remote controller according to the error contents.

8-3. Error Mode Detected by LED on Outdoor P.C. Board

<SW800: LED display in bit 1, bit 2, bit 3 OFF>

- When multiple errors are detected, the latest error is displayed.
- When LED display is ○ (Go on), there is the main cause of trouble on the objective part of control at CDB side and the unit stops.
- When LED display is ◎ (Flash), there is the main cause of trouble on the objective part of control at IPDU side and the unit stops.
- When case thermostat operates, the communication is interrupted on the serial circuit. If continuing the case thermostat operation, a serial communication error occurs because serial sending to the indoor unit is interrupted.

	No.	Item	Check code		LED display			
			Type A	Type B	D800 (Red)	D801 (Yellow)	D802 (Yellow)	D803 (Yellow)
CDB side	1	TE sensor error	F06	18	○	●	●	●
	2	TD sensor error	F04	19	○	○	●	●
	3	TS sensor error	F06	18	●	●	○	●
	4	TO sensor error	F08	1B	●	○	●	●
	5	Discharge temp. error	P03	1E	●	○	○	●
	6	DC outdoor fan error	P22	1A	○	○	○	●
	7	Communication error between IPDU (Abnormal stop)	L29	1C	○	●	●	●
	8	High-pressure release operation	P04	21 —	●	○	●	○
	9	EEPROM error	—	—	○	○	●	○
	10	Communication error between IPDU (No abnormal stop)	—	—	●	●	○	○
IPDU side	11	G-Tr short-circuit protection	P26	14	◎	●	●	●
	12	Detection circuit error	P29	16	●	◎	●	●
	13	Current sensor error	H03	17	◎	◎	●	●
	14	Phase missing detection	H03	17	●	●	●	◎
	15	Comp. lock error	H02	1D	●	●	◎	●
	16	Comp. breakdown	H01	1F	◎	●	◎	●

○ : Go on ● : Go off ◎ : Flash (5Hz)

<<Check code>>

The check codes are classified into Type A and Type B according to the used remote controller. Be sure to check the remote controller which you use.

Type A :

Neutral 2-cores type wired remote controller such as RBC-AMT21E, RBC-AS21E, and wireless remote controller kit such as TCB-AX21U (W)-E

Type B :

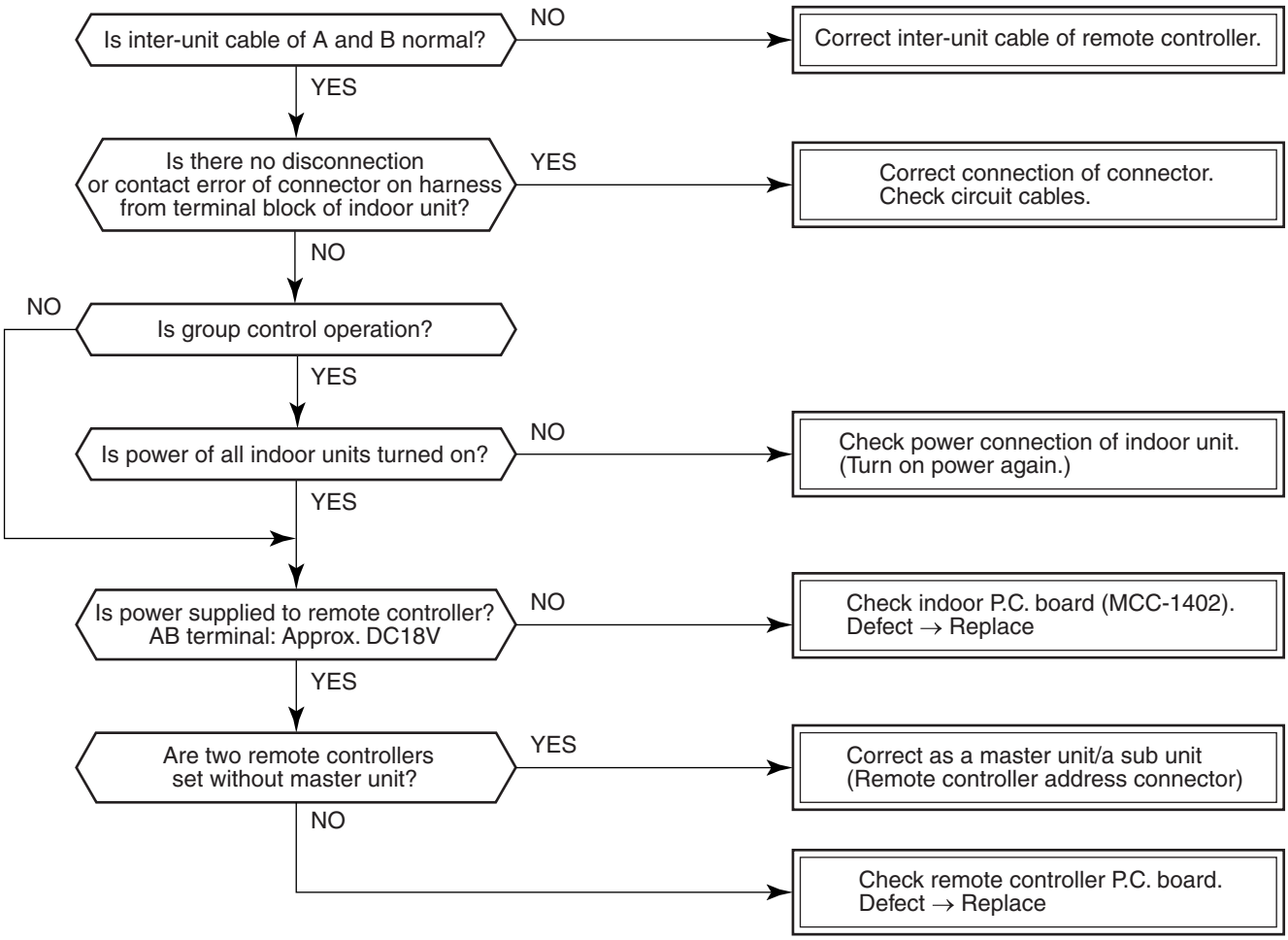
Central control remote controller such as RBC-CR64-PE

8-4. Troubleshooting Procedure for Each Check Code

8-4-1. New Check Code/Present Check Code (Central Control Side)

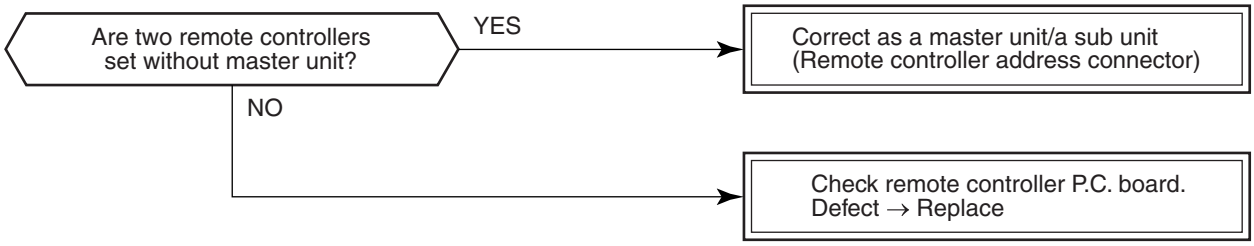
[E01 error]/*[99 error]

***** : When central controller **[99]** is displayed, there are other causes of error.

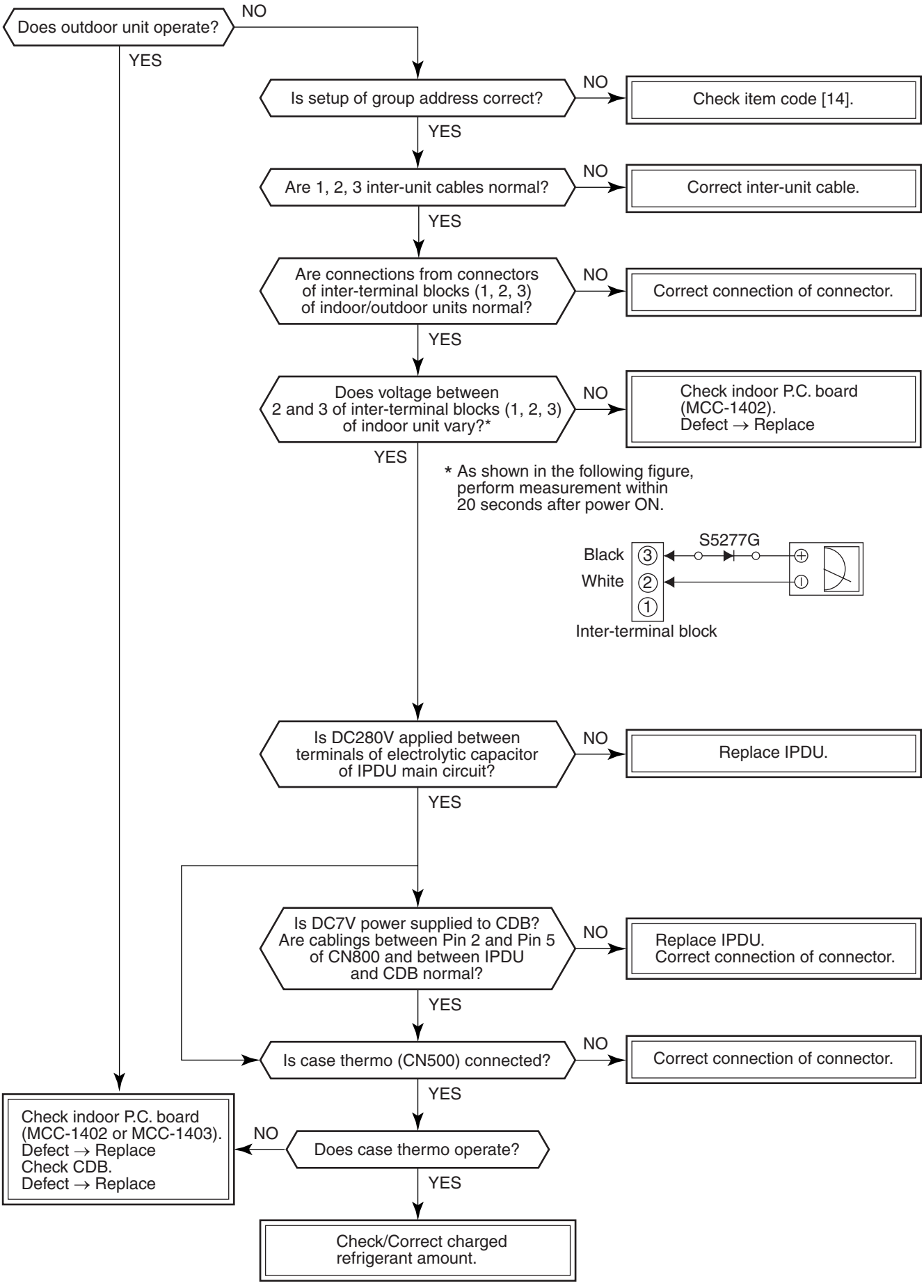

Is inter-unit cable of A and B normal?
NO
Correct inter-unit cable of remote controller.
YES
Is there no disconnection or contact error of connector on harness from terminal block of indoor unit?
YES
Correct connection of connector. Check circuit cables.
NO
NO
Is group control operation?
YES
Is power of all indoor units turned on?
NO
Check power connection of indoor unit. (Turn on power again.)
YES
Is power supplied to remote controller? AB terminal: Approx. DC18V
NO
Check indoor P.C. board (MCC-1402). Defect → Replace
YES
Are two remote controllers set without master unit?
YES
Correct as a master unit/a sub unit (Remote controller address connector)
NO
Check remote controller P.C. board. Defect → Replace

[E09 error]/*[99 error]

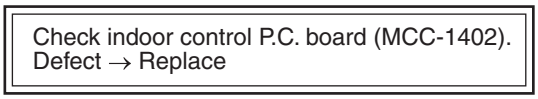
***** : When central controller **[99]** is displayed, there are other causes of error.


Are two remote controllers set without master unit?
YES
Correct as a master unit/a sub unit (Remote controller address connector)
NO
Check remote controller P.C. board. Defect → Replace

[E04 error]/[04 error]

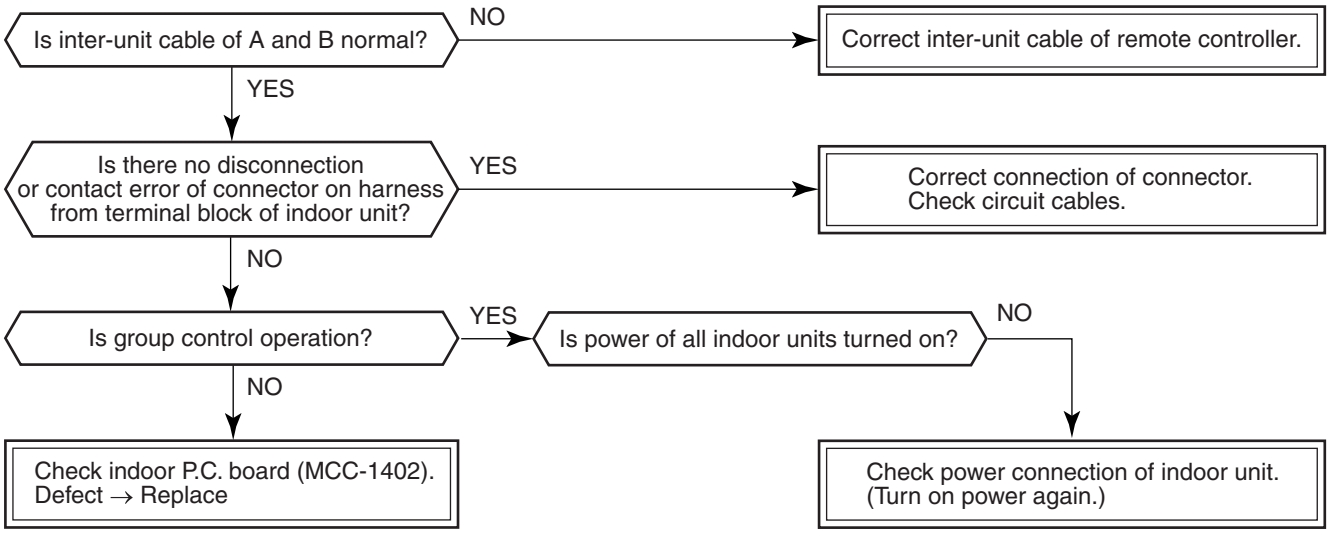

Does outdoor unit operate?
NO
YES
Is setup of group address correct?
NO
Check item code [14].
YES
Are 1, 2, 3 inter-unit cables normal?
NO
Correct inter-unit cable.
YES
Are connections from connectors of inter-terminal blocks (1, 2, 3) of indoor/outdoor units normal?
NO
Correct connection of connector.
YES
Does voltage between 2 and 3 of inter-terminal blocks (1, 2, 3) of indoor unit vary?*
NO
Check indoor P.C. board (MCC-1402). Defect → Replace
YES
* As shown in the following figure, perform measurement within 20 seconds after power ON.
S5277G
Black
White
③
②
①
Inter-terminal block
Is DC280V applied between terminals of electrolytic capacitor of IPDU main circuit?
NO
Replace IPDU.
YES
Is DC7V power supplied to CDB? Are cablings between Pin 2 and Pin 5 of CN800 and between IPDU and CDB normal?
NO
Replace IPDU. Correct connection of connector.
YES
Is case thermo (CN500) connected?
NO
Correct connection of connector.
YES
Check indoor P.C. board (MCC-1402 or MCC-1403). Defect → Replace Check CDB. Defect → Replace
NO
Does case thermo operate?
YES
Check/Correct charged refrigerant amount.

[E10 error]/[CF error]
<Only for 4-way air discharge cassette type



[E18 error]/[97 error] *[99 error]

***** : When central controller **[99]** is displayed, there are other causes of trouble.


Is inter-unit cable of A and B normal?
NO
Correct inter-unit cable of remote controller.
YES
Is there no disconnection or contact error of connector on harness from terminal block of indoor unit?
YES
Correct connection of connector. Check circuit cables.
NO
Is group control operation?
YES
Is power of all indoor units turned on?
NO
NO
Check indoor P.C. board (MCC-1402). Defect → Replace
Check power connection of indoor unit. (Turn on power again.)

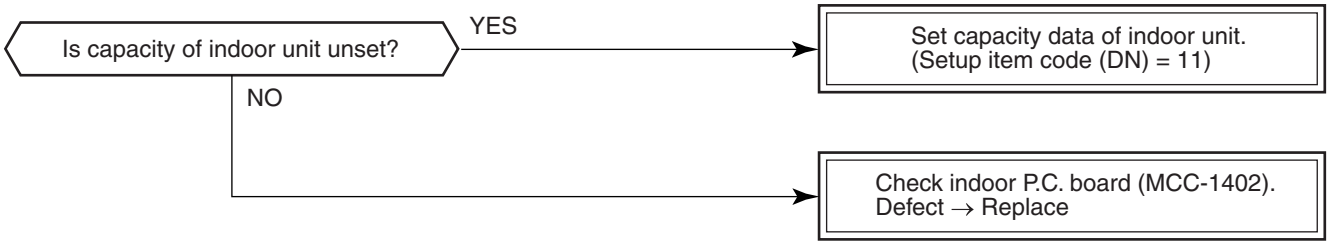
[E08, L03, L07, L08 error]/ *[96 error] [99 error]

***** : When central controller **[99]** is displayed, there are other causes of trouble.

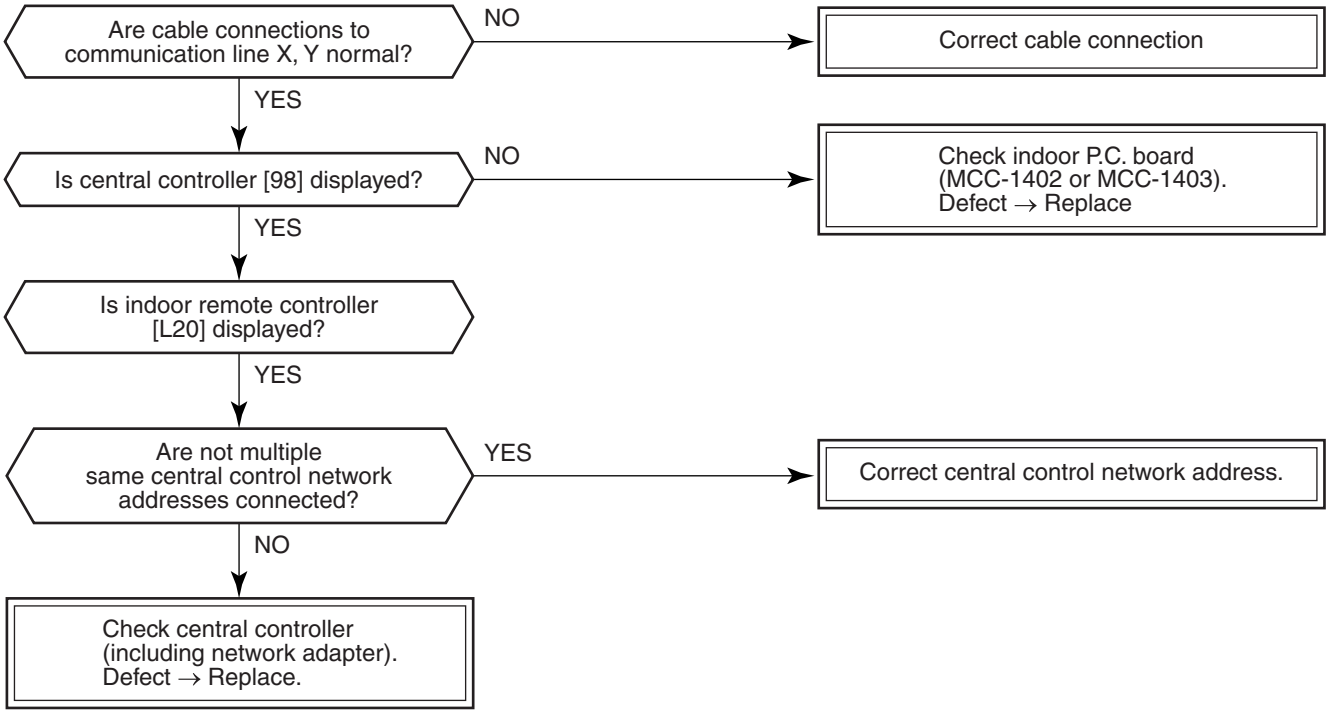
E08 : Duplicated indoor unit numbers
L03 : Two or more master units in a group control
L07 : One or more group addresses of [Individual] in a group control
L08 : Unset indoor group address (99)

If the above is detected when power has been turned on, the mode automatically enters in automatic address setup mode. (Check code is not displayed.)
However, if the above is detected during automatic address setup mode, the check code may be displayed.

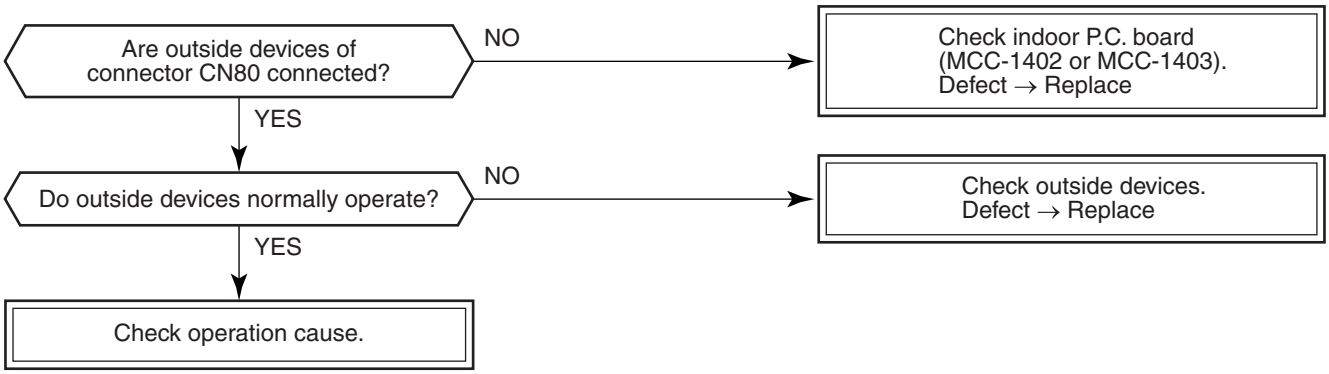
[L09 error]/[46 error]


Is capacity of indoor unit unset?
YES
Set capacity data of indoor unit. (Setup item code (DN) = 11)
NO
Check indoor P.C. board (MCC-1402). Defect → Replace

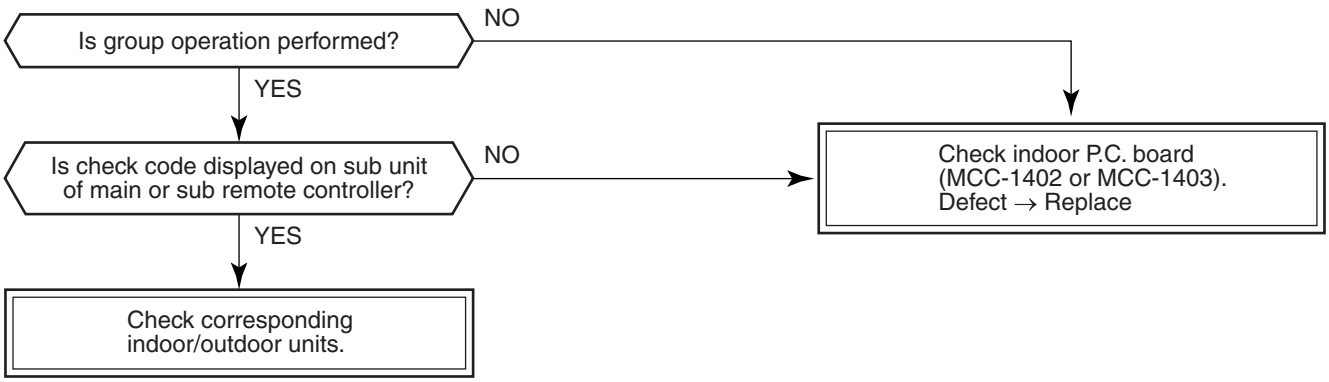
[L20 error]/[98 error]


Are cable connections to communication line X, Y normal?
NO
Correct cable connection
YES
Is central controller [98] displayed?
NO
Check indoor P.C. board (MCC-1402 or MCC-1403). Defect → Replace
YES
Is indoor remote controller [L20] displayed?
YES
Are not multiple same central control network addresses connected?
YES
Correct central control network address.
NO
Check central controller (including network adapter). Defect → Replace.

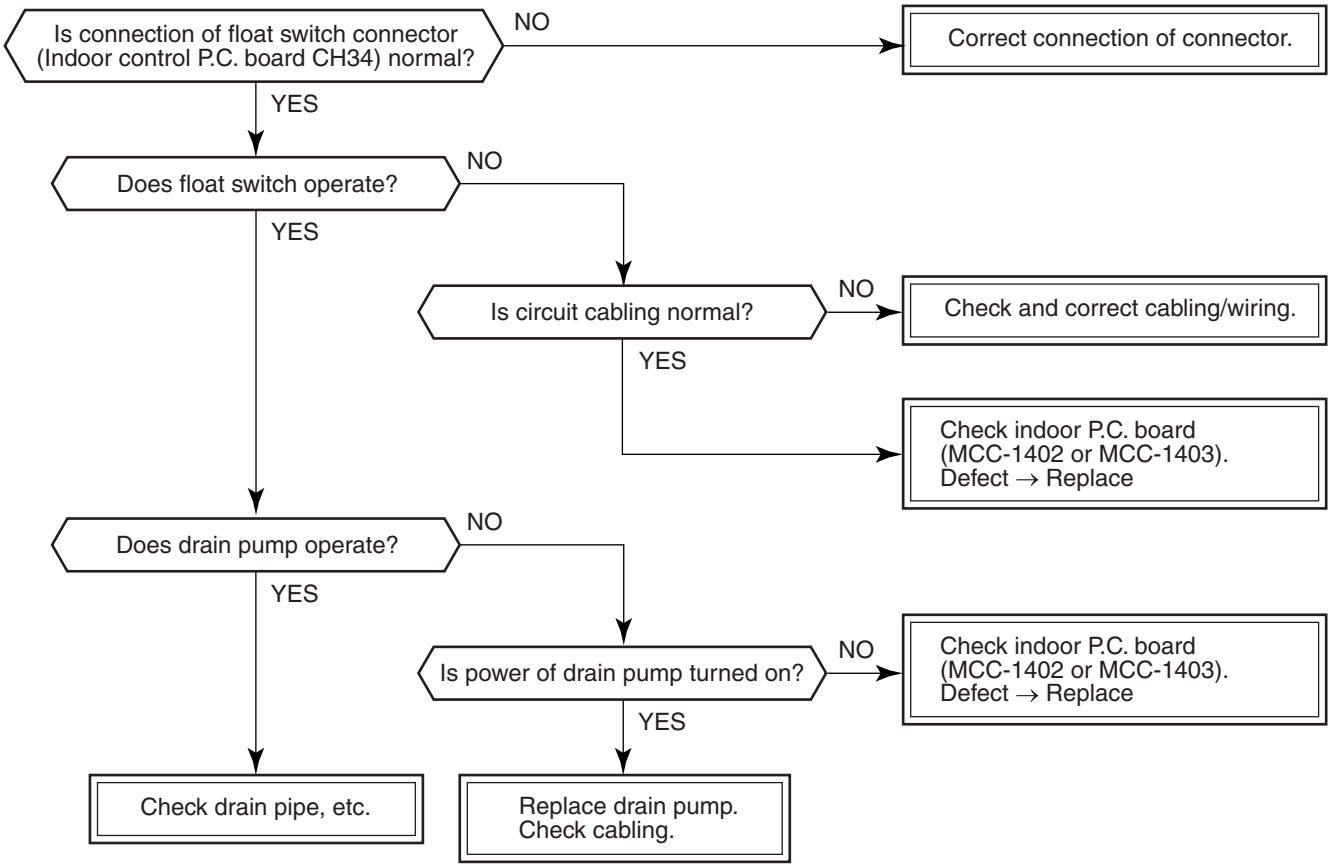
[L30 error]/[B6 error]



[b7 error] (Central controller)


Is group operation performed?
NO
YES
Is check code displayed on sub unit of main or sub remote controller?
NO
Check indoor P.C. board (MCC-1402 or MCC-1403). Defect → Replace
YES
Check corresponding indoor/outdoor units.

[P10 error]/[0b error]



[F10 error] [0C error]

Is connection of TA sensor connector (indoor P.C. board CN104) normal?
NO
Correct connection of connector.
YES
Are characteristics of TA sensor resistance value normal?
NO
Replace TA sensor.
YES
* Refer to Characteristics-1.
Check indoor P.C. board (MCC-1402 or MCC-1403). Defect → Replace

[P12 error]/[11 error]

<Only for 4-way air discharge cassette type models (RAV-SM1100UT-E/RAV-SM1400UT-E)>

Turn off the power.

Are not there connections errors or disconnection on connectors CN333 and CN334 of indoor unit P.C. board (MCC-1402)?

YES → Correct connection of connector.

NO

Remove connectors CN333 and CN334 of indoor unit P.C. board (MCC-1402).

Does the fan rotate without trouble when handling the fan with hands?

NO → Replace indoor fan motor.

YES

Are resistance values between phases at fan motor connector CN333 motor side of indoor P.C. board (MCC-1402) correct? *1

NO → Replace indoor fan motor.

YES

*1
- Are not coil windings between ① (Red lead) and ③ (White lead), between ③ (White lead) and ⑤ (Black lead), between ⑤ (Black lead) and ① (Red lead) opened or shorted?
  → For resistance, see the following values.
  SM1100 → Approx. 70 to 100Ω
  SM1400 → Approx. 35 to 60Ω
- Is not earthed between cabinet and 1, 3, 5 → 10MΩ or more

Is resistance value of fan motor connector CN333 at motor side of indoor P.C. board (MCC-1402) correct? *2

NO → Replace indoor fan motor.

YES

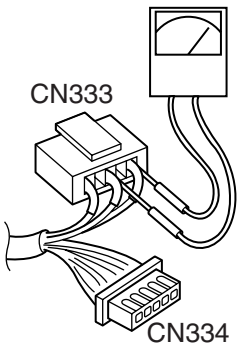
*2
Check resistance of fan motor position detection circuit.
Is not coil winding between ① (Yellow lead) and ④ (Pink lead) opened or shorted? → Resistance: Approx. 5 to 20kΩ

Is signal output of indoor fan motor position detection correct? *3

NO → Replace indoor fan motor.

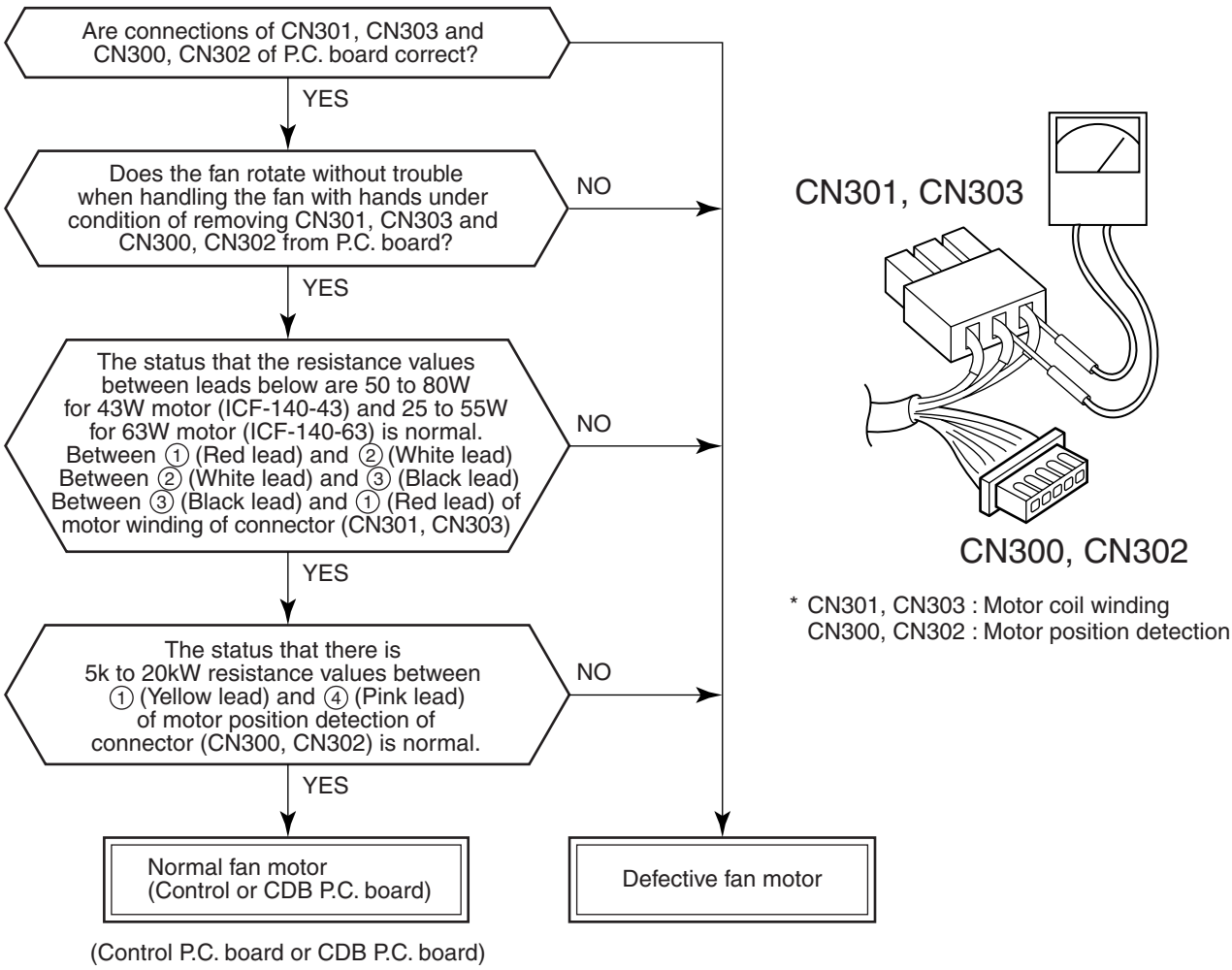
YES

*3
Check fan motor position detection signal.
- Using a tester, measure the voltage between CN334 ① and ⑤ of indoor P.C. board (MCC-1402) under condition that CN333 and CN334 are mounted and the power is turned on.
  ® Rotate the fan slowly with hands, and check the pin voltage swings between 0 to 5V voltage.
- Between ④ and ⑤ : 5V



Check indoor P.C. board (MCC-1402).
Defect → Replace

[P22 error]/[1A error]


Are connections of CN301, CN303 and CN300, CN302 of P.C. board correct?
YES
Does the fan rotate without trouble when handling the fan with hands under condition of removing CN301, CN303 and CN300, CN302 from P.C. board?
NO
YES
The status that the resistance values between leads below are 50 to 80W for 43W motor (ICF-140-43) and 25 to 55W for 63W motor (ICF-140-63) is normal.
Between ① (Red lead) and ② (White lead)
Between ② (White lead) and ③ (Black lead)
Between ③ (Black lead) and ① (Red lead) of motor winding of connector (CN301, CN303)
NO
YES
The status that there is 5k to 20kW resistance values between ① (Yellow lead) and ④ (Pink lead) of motor position detection of connector (CN300, CN302) is normal.
NO
YES
Normal fan motor (Control or CDB P.C. board)
Defective fan motor
CN301, CN303
CN300, CN302
* CN301, CN303 : Motor coil winding
CN300, CN302 : Motor position detection

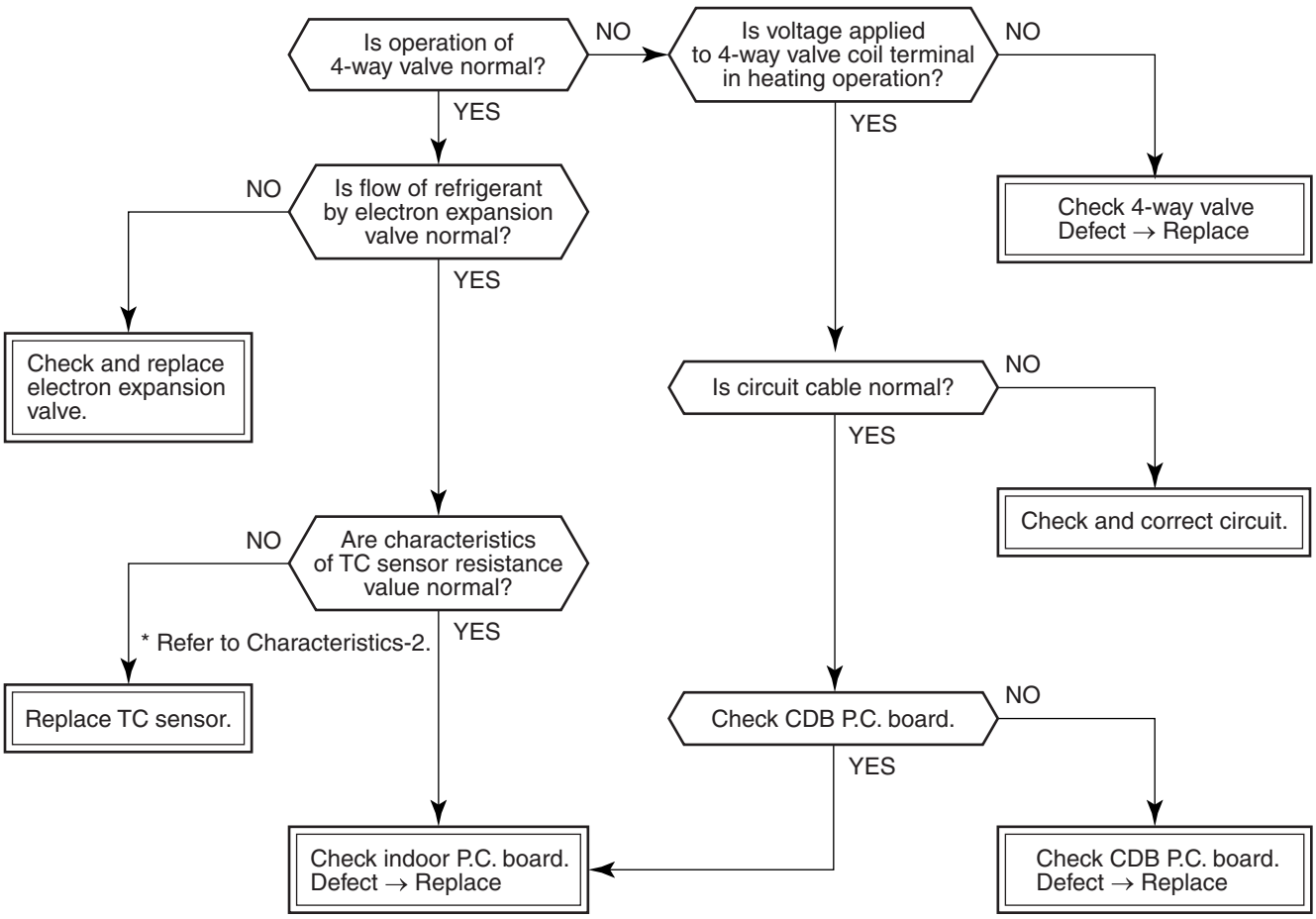
(Control P.C. board or CDB P.C. board)

NOTE :

However, GND circuit error inside of the motor is rarely detected even if the above check is carried out.
When the circuit does not become normal even if P.C. board has been replaced, replace outdoor fan motor.

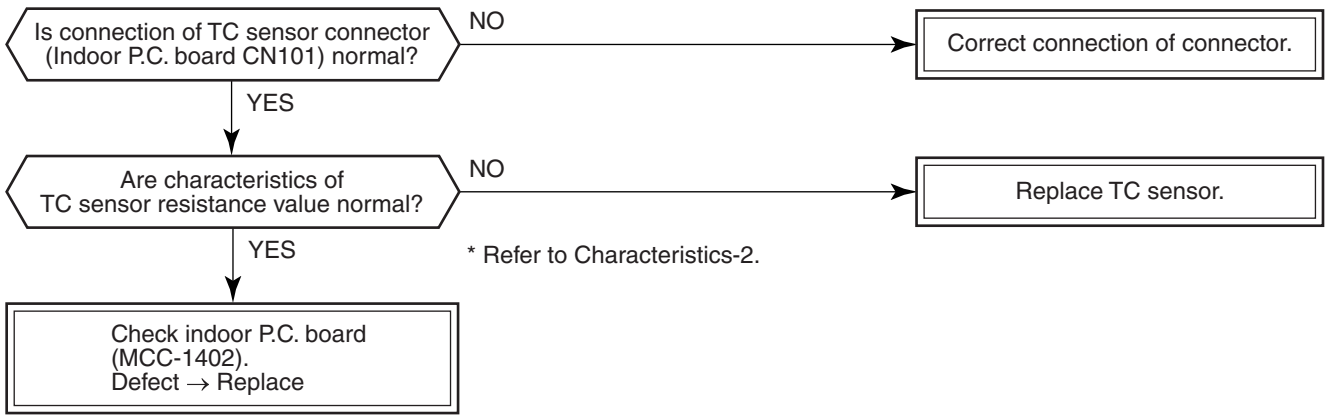
	Single phase
	RAV-SM1100AT-E, RAV-SM1400AT-E
Objective P.C. board	CDB P.C. board
Fan motor winding	CN301
Motor position detection	CN300
Fan motor winding	CN303
Motor position detection	CN302

[P19 error]/[08 error]

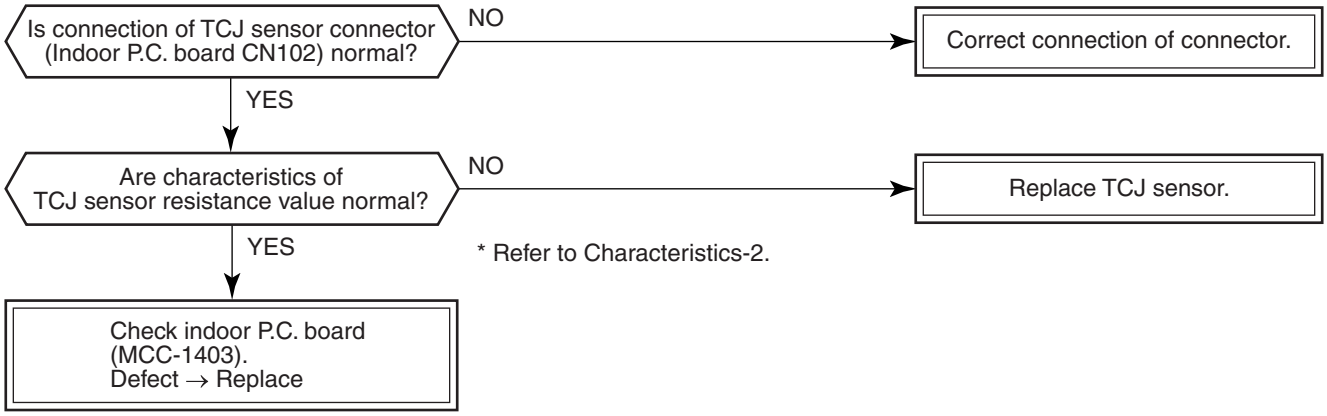


- In cooling operation, if high pressure is abnormally raised, [P19 error]/[08 error] may be displayed. In this case, remove cause of pressure up and then check again referring to the item [P04 error]/[21 error].

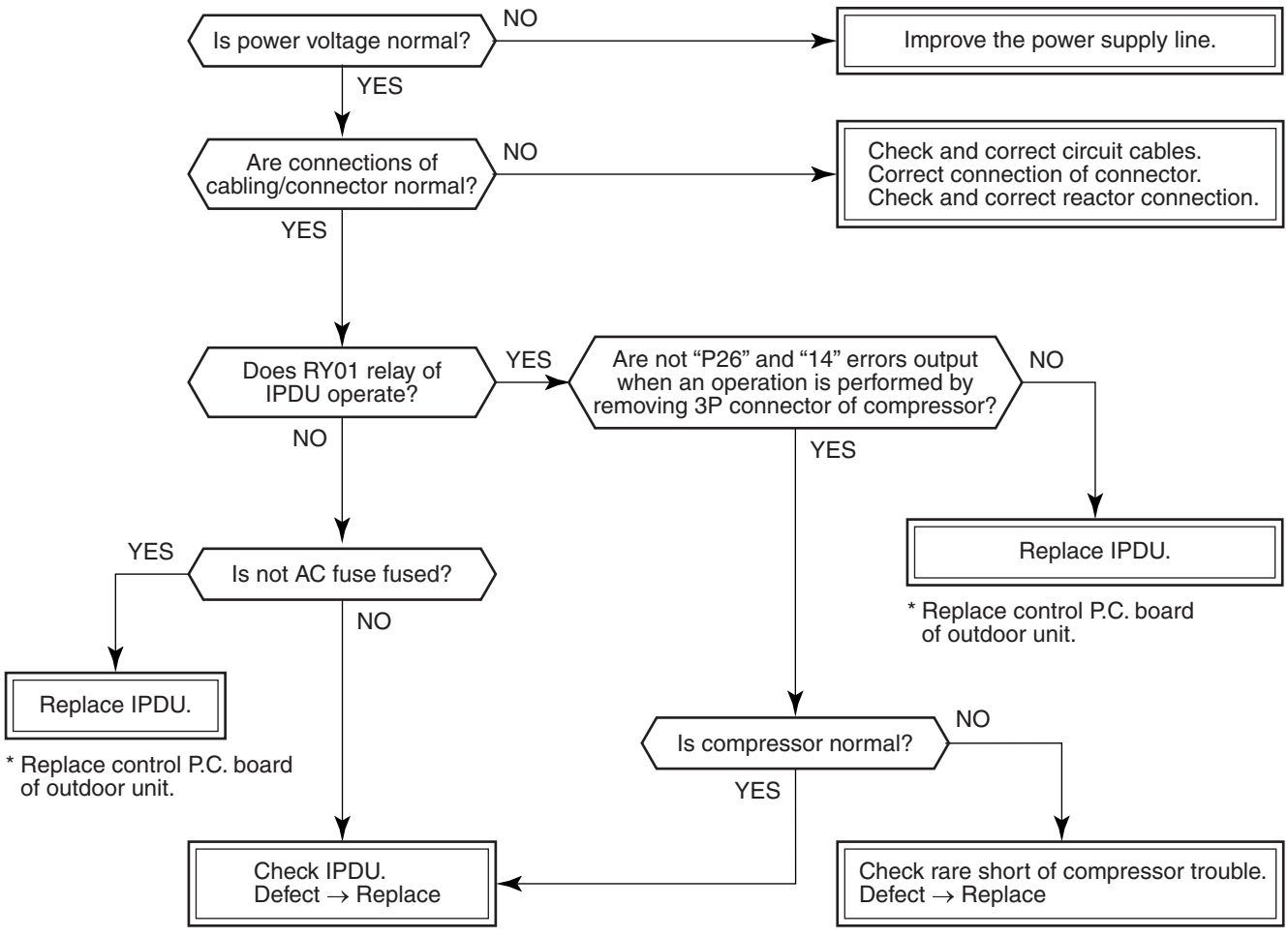
[F02 error]/[0d error]


Is connection of TC sensor connector (Indoor P.C. board CN101) normal?
NO
Correct connection of connector.
YES
Are characteristics of TC sensor resistance value normal?
NO
Replace TC sensor.
YES
* Refer to Characteristics-2.
Check indoor P.C. board (MCC-1402). Defect → Replace

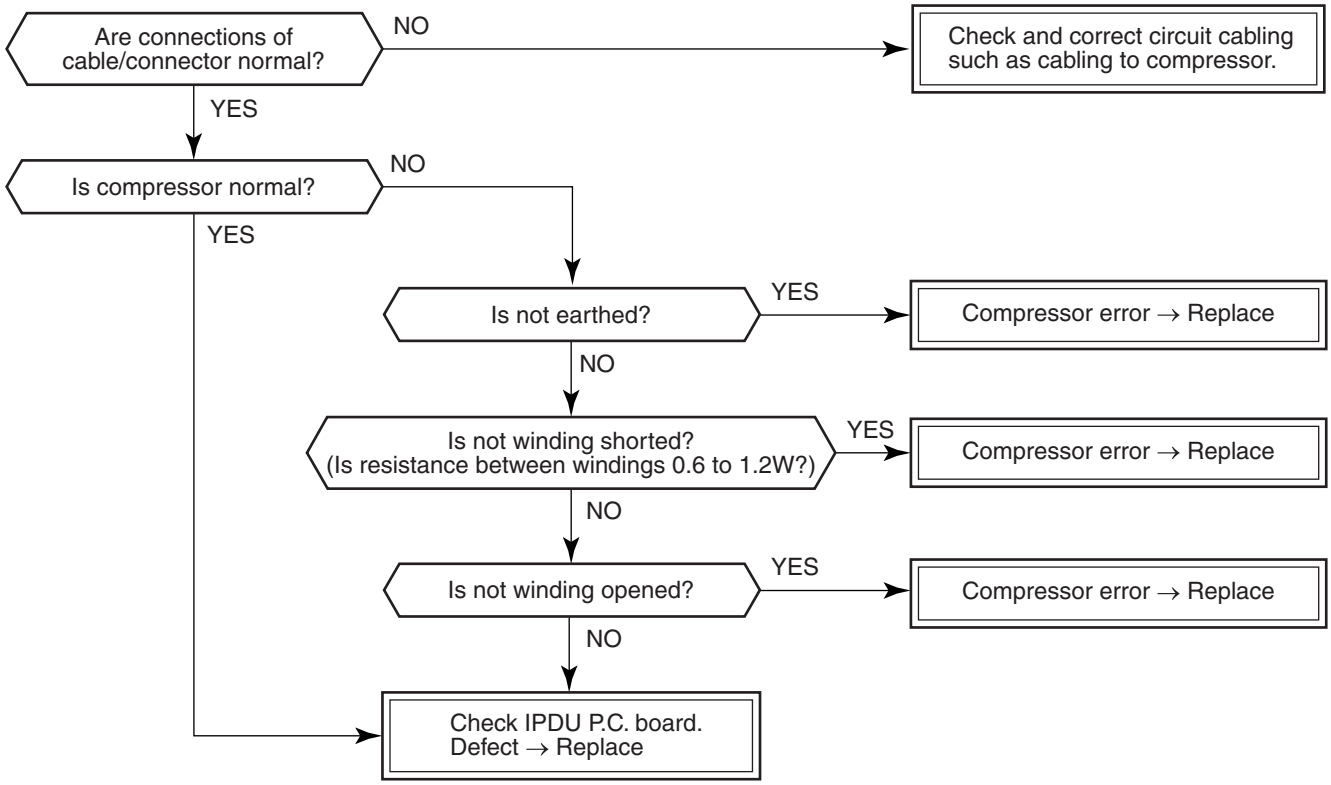
[F01 error]/[0F error]


Is connection of TCJ sensor connector (Indoor P.C. board CN102) normal?
NO
Correct connection of connector.
YES
Are characteristics of TCJ sensor resistance value normal?
NO
Replace TCJ sensor.
YES
* Refer to Characteristics-2.
Check indoor P.C. board (MCC-1403). Defect → Replace

[P26 error]/[14 error]

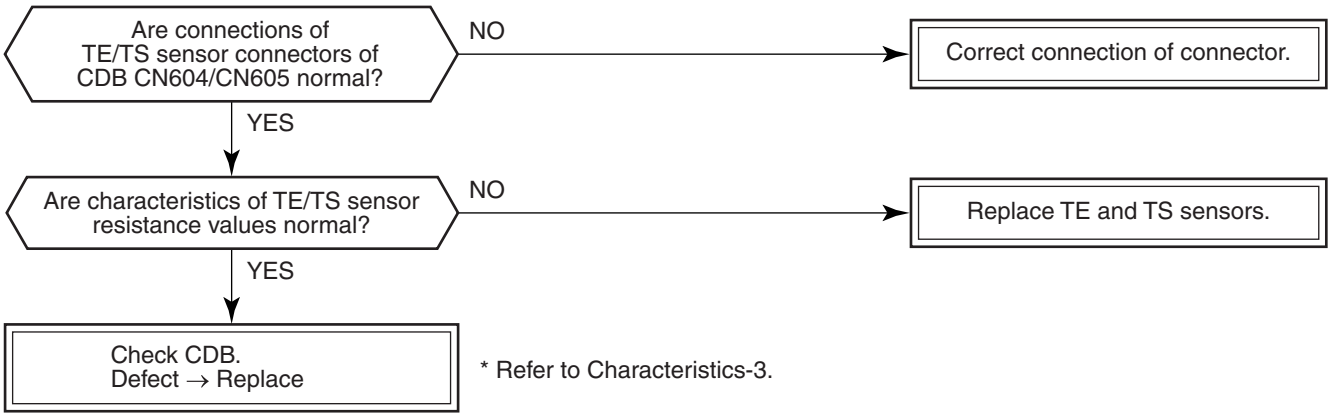

Is power voltage normal?
NO
Improve the power supply line.
YES
Are connections of cabling/connector normal?
NO
Check and correct circuit cables. Correct connection of connector. Check and correct reactor connection.
YES
Does RY01 relay of IPDU operate?
YES
Are not "P26" and "14" errors output when an operation is performed by removing 3P connector of compressor?
NO
YES
NO
Replace IPDU.
* Replace control P.C. board of outdoor unit.
YES
Is not AC fuse fused?
NO
Replace IPDU.
* Replace control P.C. board of outdoor unit.
Is compressor normal?
NO
YES
Check IPDU. Defect → Replace
Check rare short of compressor trouble. Defect → Replace

[P29 error]/[16 error]

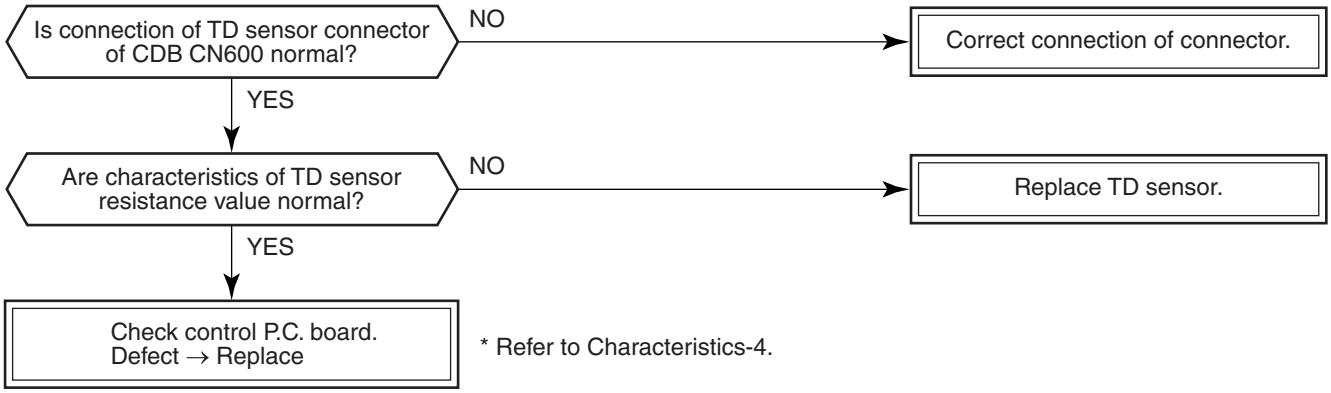


[H03 error]/[17 error]

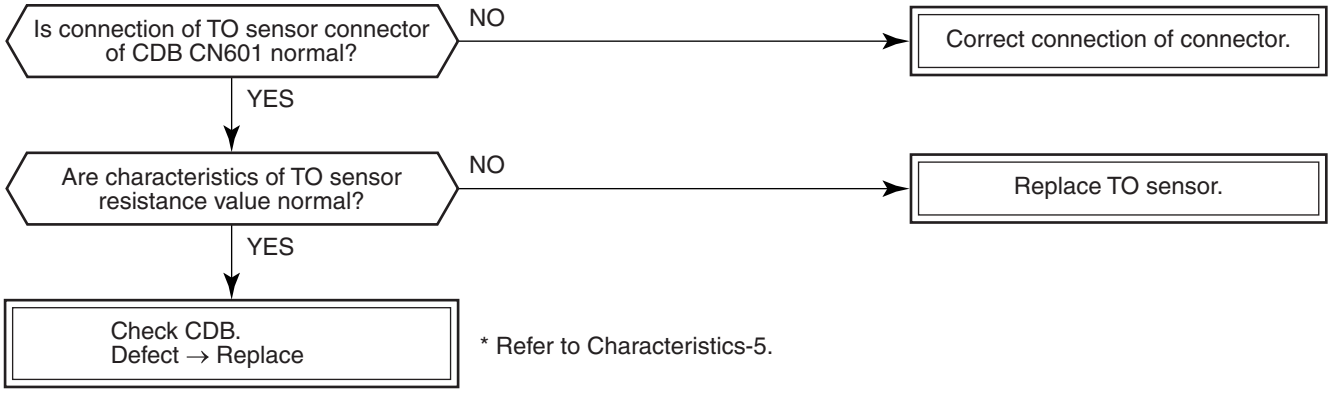
[F06 error]/[18 error]



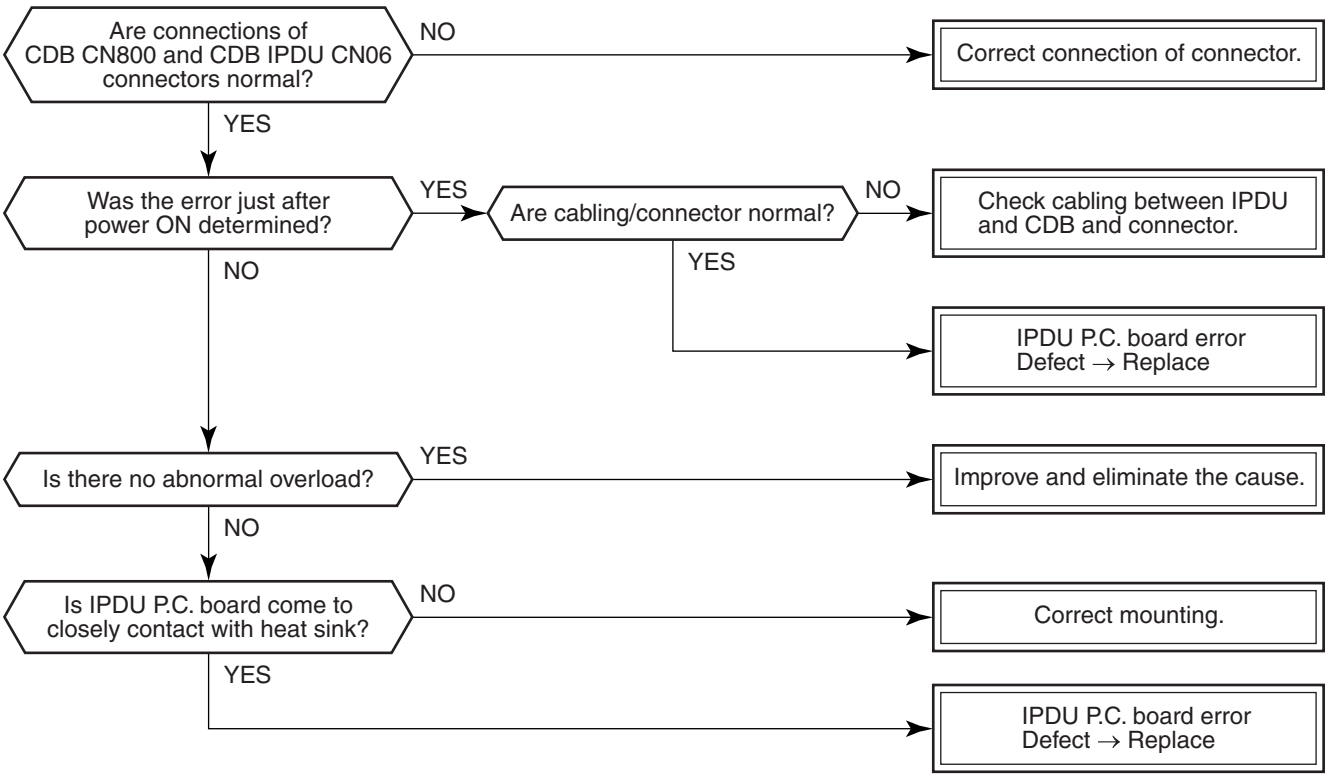
[F04 error]/[19 error]



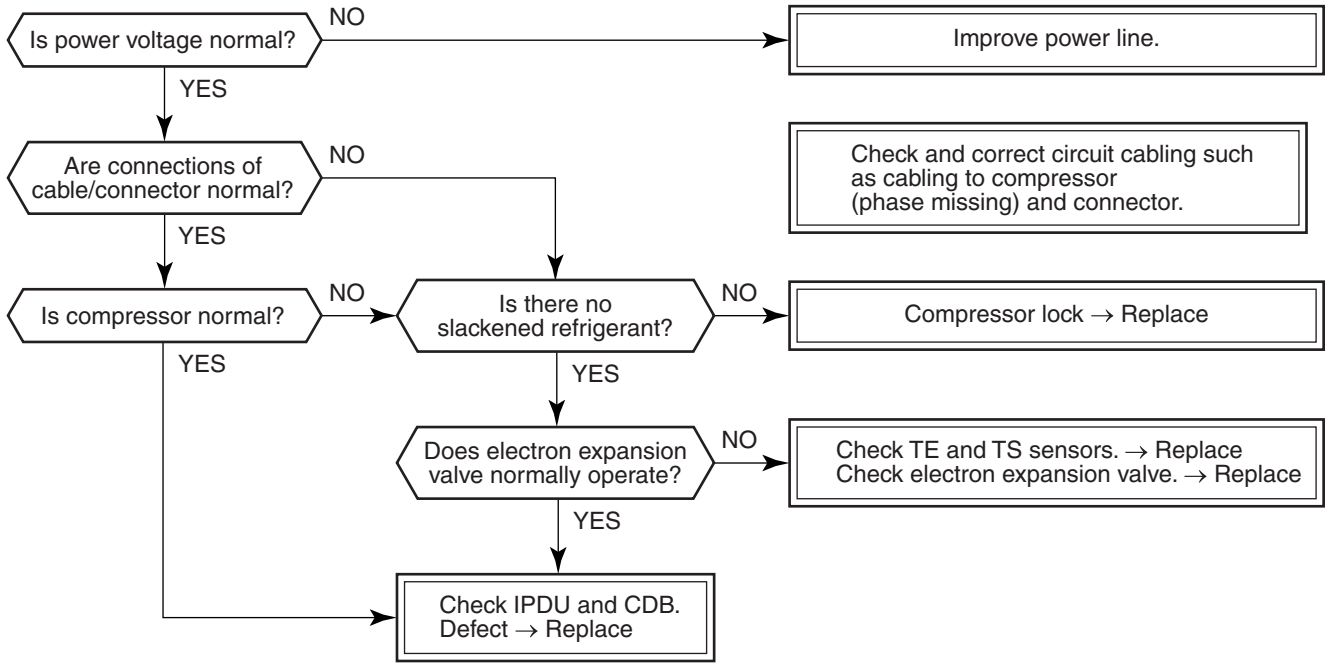
[F08 error]/[1b error]



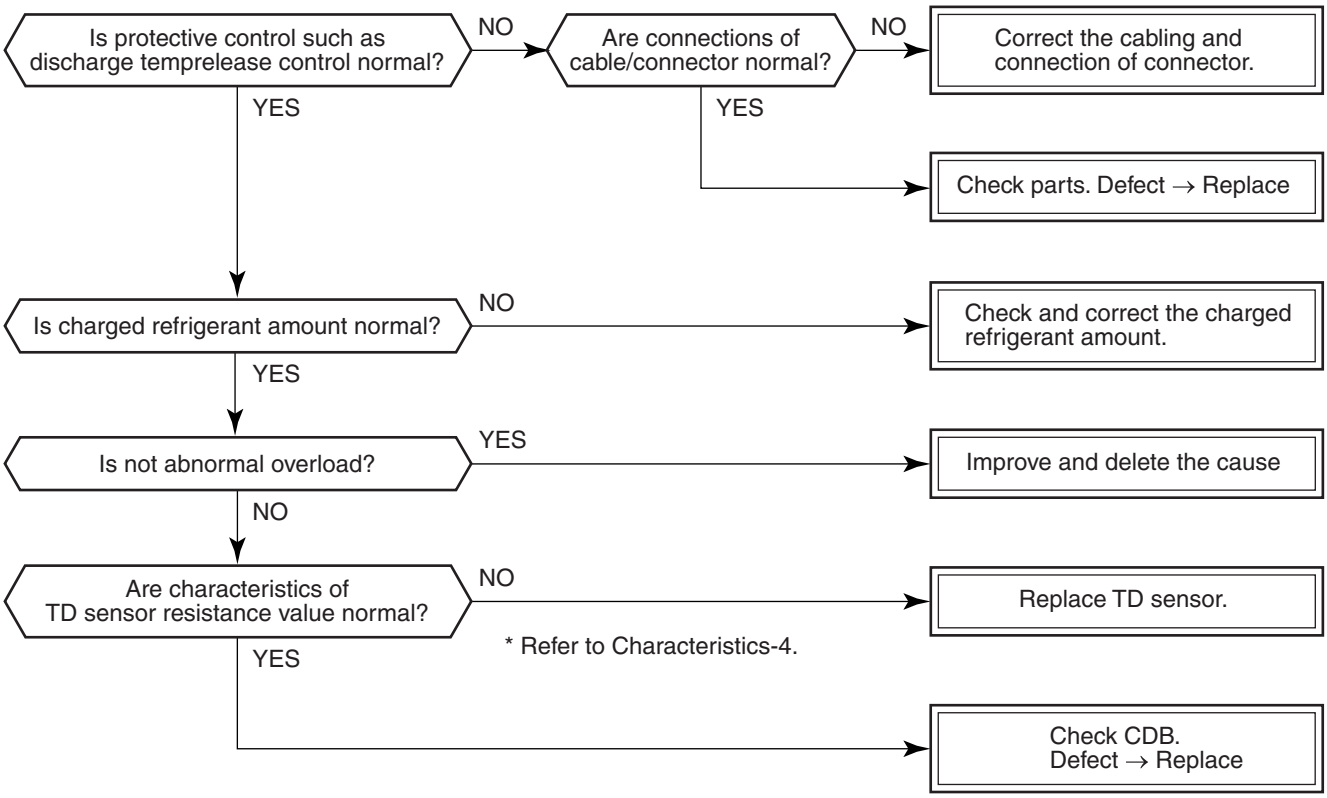
[L29 error]/[1C error]



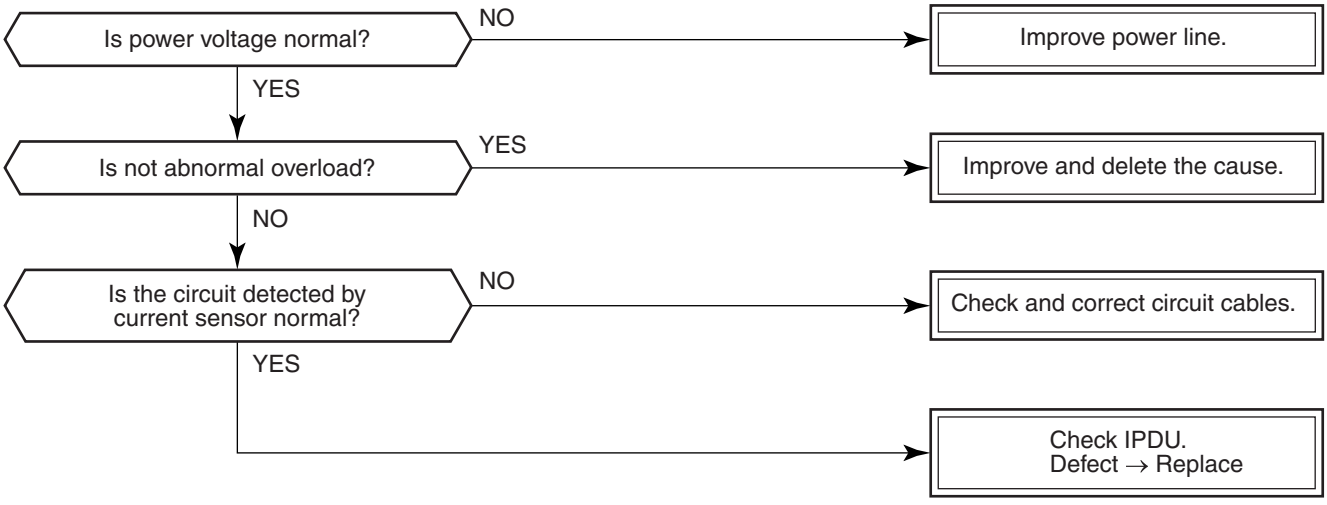
[H02 error]/[1d error]



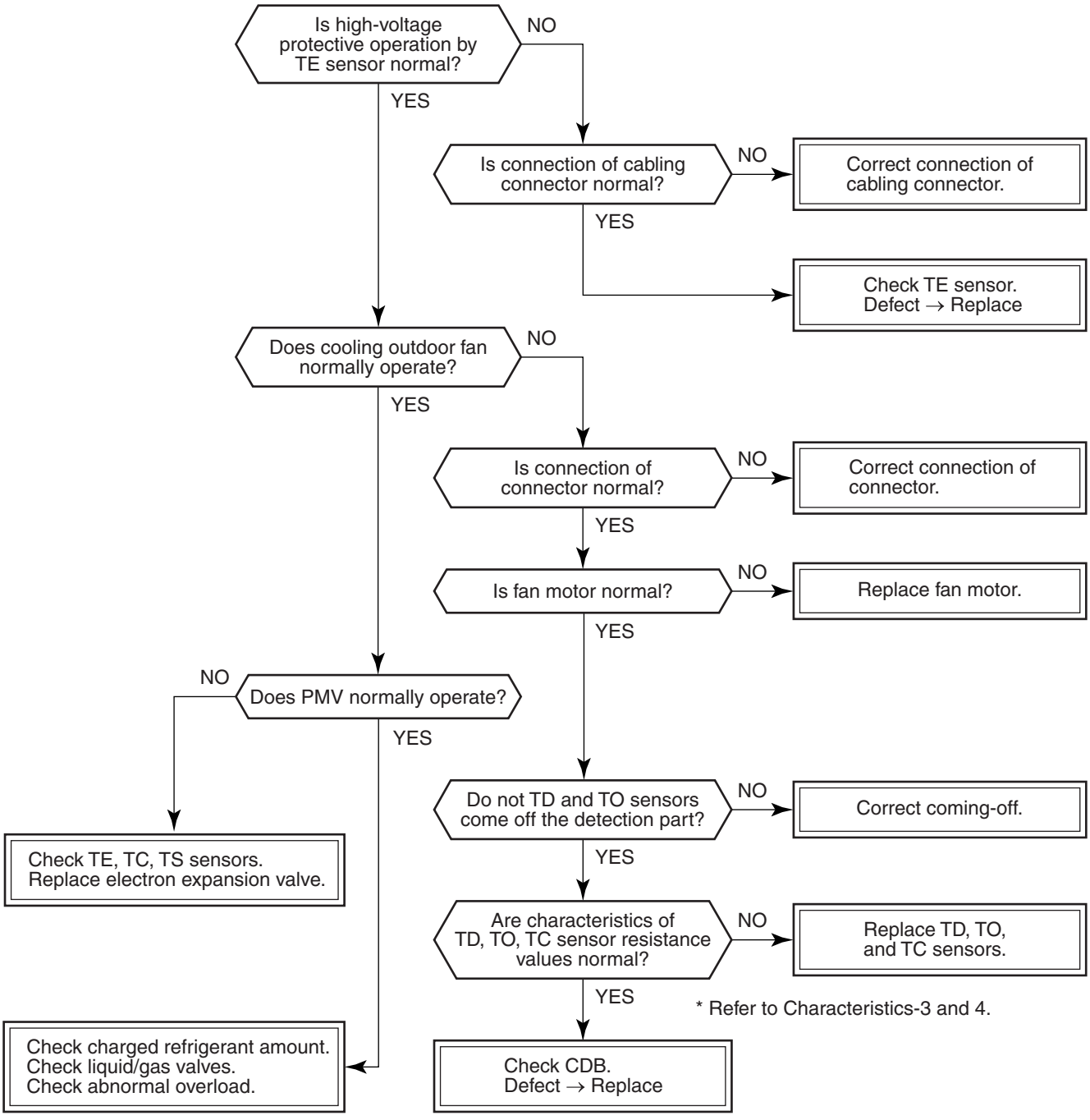
[P03 error]/[1E error]



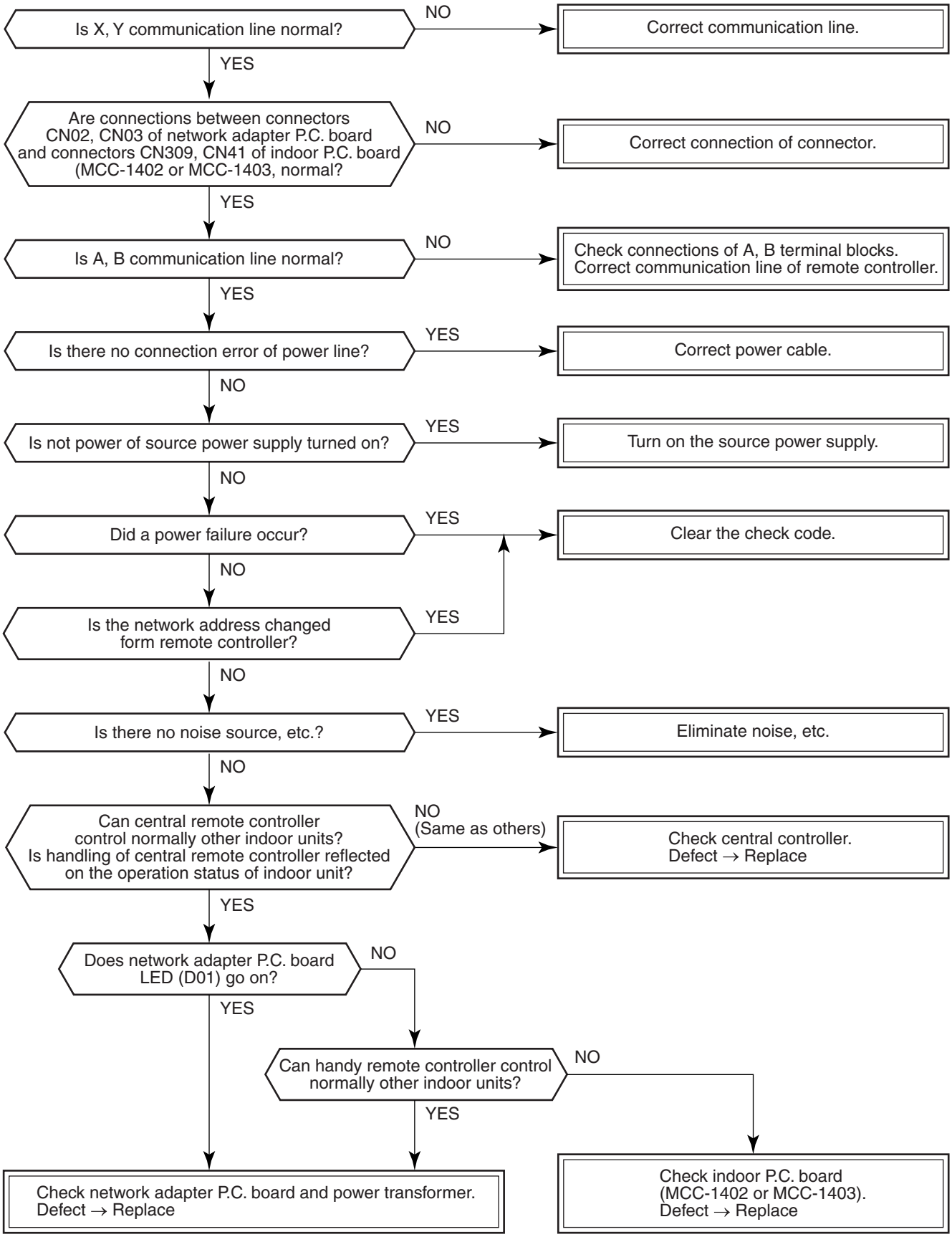
[H01 error]/[1F error]



[P04 error]/[21 error]



[97 error] (Central controller)


Is X, Y communication line normal?
NO
Correct communication line.
YES
Are connections between connectors CN02, CN03 of network adapter P.C. board and connectors CN309, CN41 of indoor P.C. board (MCC-1402 or MCC-1403, normal?
NO
Correct connection of connector.
YES
Is A, B communication line normal?
NO
Check connections of A, B terminal blocks. Correct communication line of remote controller.
YES
Is there no connection error of power line?
YES
Correct power cable.
NO
Is not power of source power supply turned on?
YES
Turn on the source power supply.
NO
Did a power failure occur?
YES
Clear the check code.
NO
Is the network address changed form remote controller?
YES
NO
Is there no noise source, etc.?
YES
Eliminate noise, etc.
NO
Can central remote controller control normally other indoor units? Is handling of central remote controller reflected on the operation status of indoor unit?
NO (Same as others)
Check central controller. Defect → Replace
YES
Does network adapter P.C. board LED (D01) go on?
NO
YES
Can handy remote controller control normally other indoor units?
NO
YES
Check network adapter P.C. board and power transformer. Defect → Replace
Check indoor P.C. board (MCC-1402 or MCC-1403). Defect → Replace

[E03 error] (Master indoor unit)

[E03 error] is detected when the indoor unit cannot receive a signal sent from the main remote controller (and central controller).

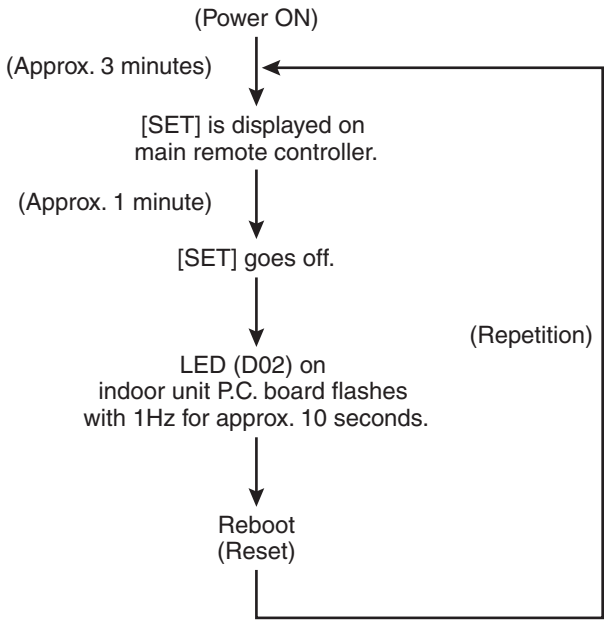
In this case, check the communication cables of the remote controllers A and B, the central control system X and Y. As communication is disabled, [E03] is not displayed on the main remote controller and the central controller. [E01] is displayed on the main remote controller and [97 error] on the central controller, respectively.

If [E03] occurs during an operation, the air conditioner stops.

[F29 error] / [12 error]

[F29 error] or [12 error] indicates detection of trouble which occurred on IC10 non-volatile memory (EEPROM) on the indoor unit P.C. board during operation of the air conditioner. Replace the service P.C. board.

* If EEPROM has not been inserted when the power was turned on or if EEPROM data never be read/written, the automatic address mode is repeated. In this time, the central controller displays [97 error].

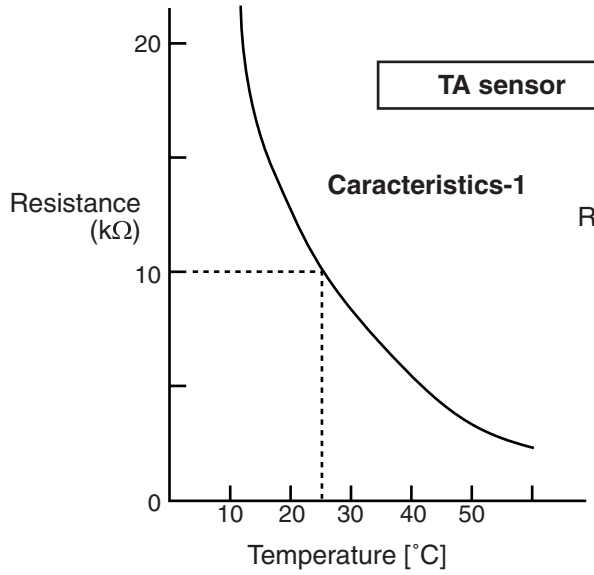


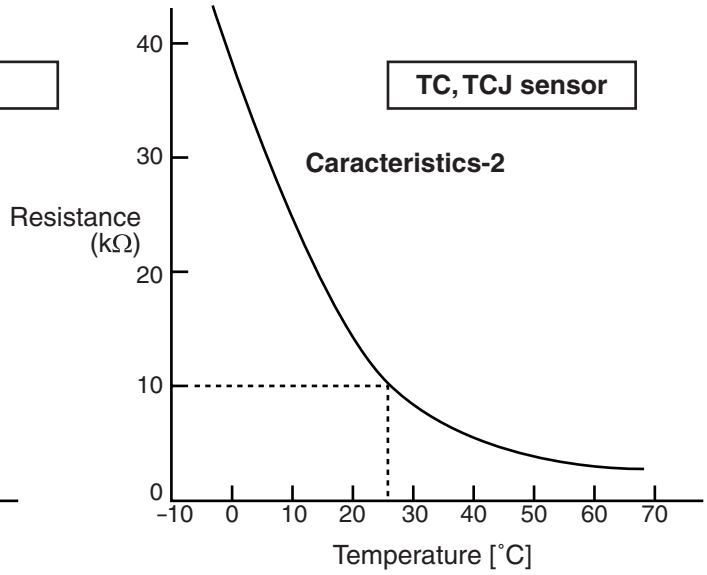
[P31 error] (Sub indoor unit)

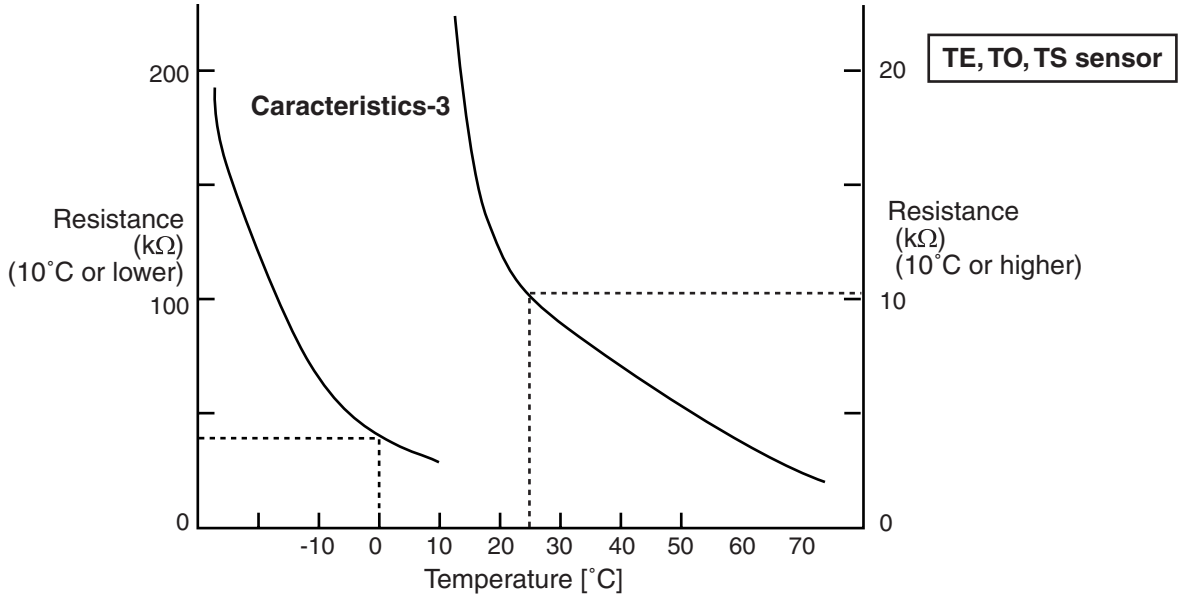
When the master unit of a group operation has detected [E03], [L03], [L07], or [L08] error, the sub unit of the group operation detects [P31 error] and then it stops. There is no display of the check code or alarm history of the main remote controller.

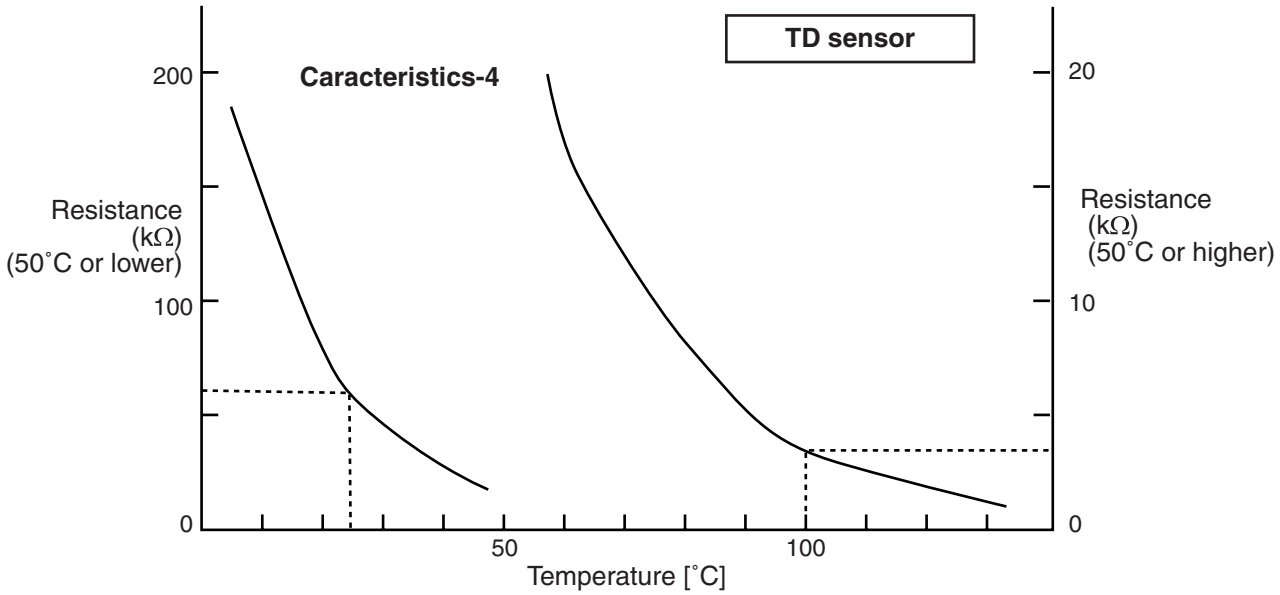
(In this model, the mode enters in automatic address set mode when the master unit has detected [E03], [L03], [L07], or [L08] error.)

8-4-2. Relational Graph of Temperature Sensor Resistance Value and Temperature







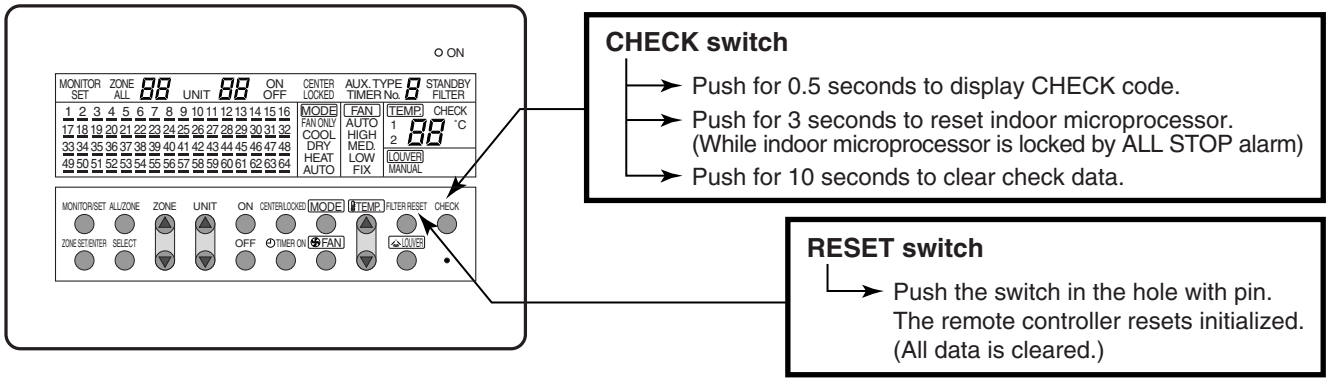


8-5. Troubleshooting

8-5-1. Troubleshooting with CHECK Display of Central Remote Controller

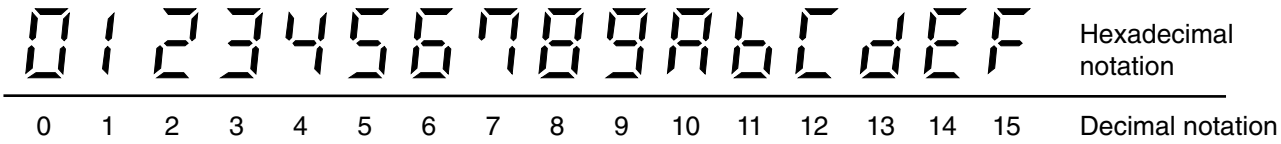
1. Operation for CHECK display

When pushing the CHECK switch, the indoor unit No. (Network address No.) including the check data is displayed in the UNIT No. display section, and the check code is displayed in the set up temp. display section.

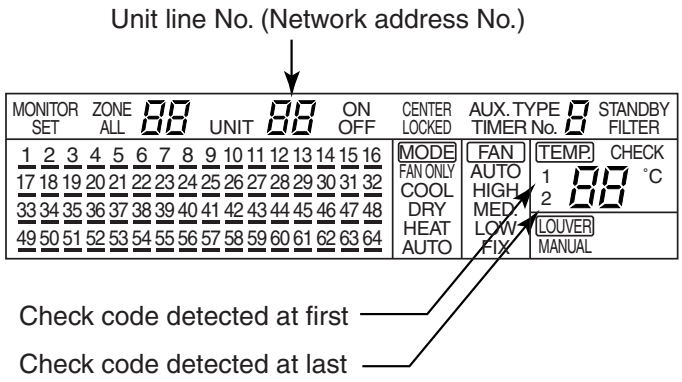


2. Reading of CHECK monitor display

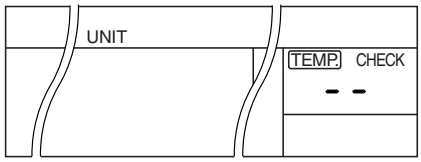
<7 segment display>



<Display on CHECK monitor>

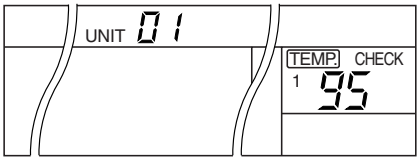


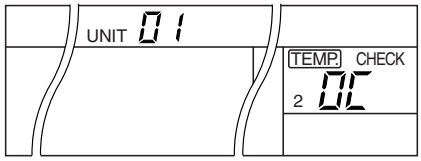
(Example)
There is no check data.

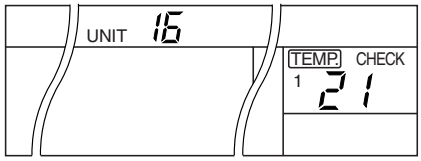


<CHECK data>

(Example)
In No.1 unit, first the interconnection wire (bus communication line) of indoor/outdoor has failed.
Next, the room temp. sensor is defective.
For No.16 unit, the high pressure switch at the inverter unit side operates.







8-5-2. Check Code Table

Error mode detected by indoor unit (1)

Operation of diagnostic function					Judgment and measures
Block display	**Check code**	**Cause of operation**	**Status of air conditioner**	**Condition**	
[MODE] [TIMER] lamp 5Hz flash	04	The serial signal is not output from outdoor unit to indoor unit. • Miscabling of inter-unit cables • Defective serial sending circuit on outdoor P.C. board • Defective serial receiving circuit on outdoor P.C. board • Compressor case thermo operation	Operation continues	Displayed when error is detected	1. Outdoor unit does not completely operate. • Inter-unit cable check, correction of miscabling • Outdoor P.C. board check, P.C. board cables check • Compressor case thermo check 2. In normal operation When outdoor sending serial LED (Green) flashes, the receiving serial LED (Orange) also flashes. : Indoor P.C. board (Main P.C. board) check When the receiving serial LED (Orange) does not flash: Outdoor P.C. board check
	97	BUS communication circuit error * BUS communication was interrupted over the specified time.	Operation continues (According to remote controller of indoor unit)	Displayed when error is detected	1. Communication line check, miscabling check Power supply check for central controller (Central control remote controller, etc.) and indoor unit 2. Communication check (XY terminal) 3. Indoor P.C. board check 4. Central controller check (Communication P.C. board)
	98	Network address miss-setting • Addresses of central controllers (Central control remote controller, etc.) are duplicated.	Operation continues	Displayed when error is detected	1. Check central control system network address setting. (SW02) 2. Indoor P.C. board check 3. Central controller check (Communication P.C. board)
	08	Error in 4-way valve system • Indoor heat exchanger temperature rise after start of cooling operation. • Indoor heat exchanger temperature fall after start of heating operation.	Operation continues	Displayed when error is detected	1. Check 4-way valve. 2. Check 2-way valve and non-return valve. 3. Check indoor heat exchanger sensor (TC). 4. Check indoor P.C. board (Main P.C. board).
	09 *	Error in other cycles • Indoor heat exchanger temp (TC) does not vary after start of cooling/heating operation.	Operation continues	Displayed when error is detected	1. Compressor case thermo operation 2. Coming-off of detection part of indoor heat exchanger sensor 3. Check indoor heat exchanger sensor (TC). 4. Check indoor P.C. board (Main P.C. board).
[MODE] lamp 5Hz flash	0C	Coming-off, disconnection or short of indoor temp sensor (TA)	Operation continues	Displayed when error is detected	1. Check indoor temp sensor (TA). 2. Check indoor P.C. board (Main P.C. board).
	0d	Coming-off, disconnection or short of indoor temp sensor (TC)	Operation continues	Displayed when error is detected	1. Check indoor temp sensor (TC). 2. Check indoor P.C. board (Main P.C. board).
	0F	Coming-off, disconnection or short of indoor temp sensor (TCJ)	Operation continues	Displayed when error is detected	1. Check indoor temp sensor (TCJ). 2. Check indoor P.C. board (Main P.C. board).

* : No display in the setting at shipment

Error mode detected by indoor unit (1)

Operation of diagnostic function					Judgment and measures
Block display	**Check code**	**Cause of operation**	**Status of air conditioner**	**Condition**	
[MODE] lamp 5Hz flash	11	Error in indoor fan system Revolutions frequency error of fan	All stop	Displayed when error is detected	1. Check indoor fan motor connector circuit (CN210). 2. Check indoor fan. 3. Check indoor P.C. board (Main P.C. board).
	12	Error in indoor unit or other positions 1. EEPROM access error	Operation continues	Displayed when error is detected	1. Check indoor P.C. board (EEPROM and peripheral circuits) (Main P.C. board).
	b5	Outside error input Detected by input voltage level from outside devices	Operation continues	Displayed when error is detected	1. Check outside devices. 2. Check indoor P.C. board (Main P.C. board).
	b6	Outside interlock input Detected by input voltage level from outside devices	All stop	Displayed when error is detected	1. Check outside devices. 2. Check indoor P.C. board (Main P.C. board).

Error mode detected by indoor unit (2)

Operation of diagnostic function				Judgment and measures
Check code	**Cause of operation**	**Status of air conditioner**	**Condition**	
99	Serial return signal is not sent from No. 1 indoor unit to remote controller. • Miscabling of inter-unit cable between remote controller and indoor unit • Miss-setting of indoor unit No. (Group address)	ON/OFF	Displayed when error is detected	1. Indoor unit does not completely operate. • Check inter-unit cable. • Check indoor P.C. board. (Main/Sub P.C. boards) • Check remote controller. 2. In normal operation • Check setting of indoor unit No. (SW01) (Sub P.C. board) • Check remote controller.

Error mode detected by outdoor unit

Operation of diagnostic function				Judgment and measures
Check code	Cause of operation	Status of air conditioner	Condition	
14	Inverter over-current protective circuit operates. (For a short time)	All stop	Displayed when error is detected	1. Inverter immediately stops even if restarted. • Compressor rare short 2. Check IPDU. • Cabling error
17	Error on current detection circuit • Current value is high at AC side even while compressor stops. • Phase of power supply is missed.	All stop	Displayed when error is detected	1. Compressor immediately stops even if restarted. : Check IPDU. 2. Phase-missing operation of power supply • Check power voltage of R, S, T.
18	Coming-off, disconnection or short of outdoor temp sensor	All stop	Displayed when error is detected	1. Check outdoor temp sensor (TE, TS). 2. Check CDB.
19	Coming-off, disconnection or short of outdoor temp sensor	All stop	Displayed when error is detected	1. Check outdoor temp sensor (TD). 2. Check CDB.
1C	Compressor drive output error • Tin thermistor temp, Tin error (IPDU heat sink temp. is high.) Communication error between IPDU • Connector coming-off between CDB and IPDU	All stop	Displayed when error is detected	1. Abnormal overload operation of refrigerating cycle 2. Loosening of screws and contact error of IPDU and heat sink 3. Cooling error of heat sink 4. Check cabling of CDB and IPDU.
1d	Compressor does not rotate. (Over-current protective circuit works when constant time passed after activation of compressor.)	All stop	Displayed when error is detected	1. Compressor error (Compressor lock, etc.) : Replace compressor. 2. Cabling trouble of compressor (Phase missing)
1E	Discharge temp error • Discharge temp over specified value was detected.	All stop	Displayed when error is detected	1. Check refrigerating cycle. (Gas leak) 2. Error of electron control valve 3. Check pipe sensor (TD).
1F	Compressor breakdown • Operation frequency lowered and stops though operation had started.	All stop	Displayed when error is detected	1. Check power voltage. (AC200V±20V) 2. Overload operation of refrigerating cycle 3. Check current detection circuit at AC side.
21	High-voltage protection error by TE sensor • TE temp over specified value was detected.	All stop	Displayed when error is detected	1. Overload operation of refrigerating cycle 2. Check outdoor temp sensor (TE).
1A	DC outdoor fan motor error • IDC operation or lock was detected by DC outdoor fan driving.	All stop	Displayed when error is detected	1. Position detection error 2. Over-current protection circuit operation of outdoor fan drive unit • Check CDB. • Refer to Judgment of outdoor fan.
16	Error on IPDU position detection circuit	All stop	Displayed when error is detected	1. Position detection circuit operates even if driving by removing 3P connector of compressor. • Replace IPDU.
1b	Coming-off, disconnection or short of outdoor temp sensor	Operation continues	Displayed when error is detected	1. Check outdoor temp sensor (TO). 2. Check P.C. board.

9. REPLACEMENT OF SERVICE INDOOR P.C. BOARD

[Requirement when replacing the service indoor P.C. board assembly]

In the non-volatile memory (Hereinafter said EEPROM, IC10) installed on the indoor P.C. board before replacement, the type and capacity code exclusive to the corresponding model have been stored at shipment from the factory and the important setup data such as system/indoor/group address set in (AUTO/MANUAL) mode or setting of high ceiling selection have been stored at installation time. Replace the service indoor P.C. board assembly according to the following procedure.

After replacement, check the indoor unit address and also the cycle by a test run.

<REPLACEMENT PROCEDURE>

CASE 1

Before replacement, power of the indoor unit can be turned on and the setup data can be readout from the wired remote controller.

Read EEPROM data *1 (ref. P53)

⇩

Replace service P.C. board & power ON *2 (ref. P53)

⇩

Write the read data to EEPROM *3 (ref. P54)

⇩

Power reset (All indoor units in the group when group operation)

CASE 2

Before replacement the setup data can not be readout from the wired remote controller.

Replace service P.C. board & power ON *2 (ref. P53)

⇩

Write the data such as high ceiling setup to EEPROM (According to the customers' information) *3

⇩

Power reset (All indoor units in the group when group operation)

❒1 Readout of the setup data from EEPROM

(Data in EEPROM contents, which have been changed at the local site, are read out together with data in EEPROM set at shipment from the factory.)

1. Push SET, CL, and ⌂ buttons of the remote controller at the same time for 4 seconds or more. ***1***
   (Corresponded with No. in Remote controller)
   When group operation, the master indoor unit address is displayed at the first time. In this time, the item code (DN) 10 is displayed. The fan of the selected indoor unit operates and the flap starts swinging if any.
2. Every pushing UNIT button, the indoor unit address in the group are displayed successively. ***2*** Specify the indoor unit No. to be replaced.
3. Using the set temperature ▲ / ▼ buttons, the item code (DN) can be moved up and down one by one. ***3***
4. First change the item code (DN) from 10 to 01. (Setting of filter sign lighting time) Make a note of the set data displayed in this time.
5. Next change the item code (DN) using the set temperature ▲ / ▼ buttons. Also make a note of the set data.
6. Repeat item 5. and make a note of the important set data as shown in the later table (Ex.).
   • 01 to 9F are provided in the item code (DN). On the way of operation, DN No. may come out.
7. After finishing making a note, push ⌂ button to return the status to usual stop status. ***6***
   (Approx. 1 minute is required to start handling of the remote controller.)

Minimum requirements for item code

DN	Contents
10	Type
11	Indoor unit capacity
12	Line address
13	Indoor address
14	Group address

(1) Type and capacity of the indoor unit is necessary to set the revolutions frequency of the fan.

(2) If Line/Indoor/Group addresses differ from those before replacement, the mode enters in automatic address setup mode and a manual resetting may be required.

❒2 Replacement of service P.C. board

1. Replace the P.C. board with a service P.C. board.
   In this time, setting of jumper line (cut) or setting of (short-circuit) connecting connectors on the former P.C. board should be reflected on the service P.C. board.
2. According to the system configuration, turn on power of the indoor unit with any method in the following items.
   a) In case of single (individual) operation
      Turn on the power supply.
      1) Wait for completion of automatic address setup mode (Required time: Approx. 5 minutes) and then proceed to **❒3**.
         (Line address = 1, Indoor address = 1, Group address = 0 (Individual) are automatically set.)
      2) Push SET, CL, and ⌂ buttons of the remote controller at the same time for 4 seconds or more (***1*** operation), interrupt the automatic address setup mode, and then proceed to **❒3**.
         (Unit No. ALL is displayed.)
   b) In case of group operation
      Turn on power of the indoor unit of which P.C. board has been replaced with the service P.C. board with any method in the following items.
      1) Turn on power of the replaced indoor unit only.
         (However, the remote controller is also connected. Otherwise **❒3** operation cannot be performed.)
         Same as 1) and 2) in item a).
      2) Turn on power of the multiple indoor units including replaced indoor unit.
      • Only 1 system for twin, triple, double twin
      • For all units in the group
      Wait for completion of automatic address setup mode (Required time: Approx. 5 minutes) and then proceed to **❒3**.

* The master unit of a group may change by setup of automatic address. The line address/indoor address of the replaced indoor unit are automatically set to the vacant addresses except addresses belonging to other indoor units which have not been replaced. It is recommended to make a note that the refrigerant line which includes the corresponding indoor unit and that the corresponding indoor unit is master or sub in the group control.

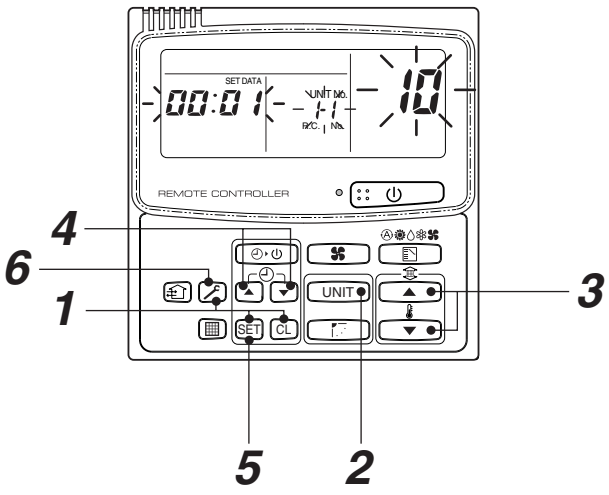
❒3 Writing of the setup contents to EEPROM

(The contents of EEPROM installed on the service P.C. board have been set up at shipment from the factory.)

1. Push SET, CL, and ⌀ buttons of the remote controller at the same time for 4 seconds or more. **1**
   (Corresponded with No. in Remote controller)

   In group operation control, the master indoor unit No. is displayed at the first time. (If the automatic address setup mode is interrupted in item 2. - a) - 2) in the previous page, the unit No. ALL is displayed.) In this time, the item code (DN) 10 is displayed. The fan of the selected indoor unit operates and the flap starts swinging if any.
2. Every pushing UNIT button, the indoor unit numbers in the group control are displayed successively. **2**
   Specify the indoor unit No. of which P.C. board has been replaced with a service P.C. board.
   (When the unit No. ALL is displayed, this operation cannot be performed.)
3. Using the set temperature ▲ / ▼ buttons, the item code (DN) can be moved up and down one by one. **3**
4. First set a type and capacity of the indoor unit.
   (Setting the type and capacity writes the data at shipment from the factory in EEPROM.)
   1) Set the item code (DN) to 10. (As it is)
   2) Using the timer time ▲ / ▼ buttons, set up a type. **4**
      (For example, 4-way air discharge cassette type is 0001) Refer to the attached table.
   3) Push SET button. (OK when the display goes on.) **5**
   4) Using the set temperature ▲ / ▼ buttons, set 11 to the item code (DN).
   5) Using the timer time ▲ / ▼ buttons, set the capacity.
      (For example, 0012 for class 80) Refer to the attached table.
   6) Push SET button. (OK when the display goes on.)
   7) Push ⌀ button to return the status to usual stop status. **6**
      (Approx. 1 minute is required to start handling of the remote controller.)
5. Next write the contents which have been set up at the local site such as the address setup in EEPROM.
   Repeat the above procedure 1. and 2.
6. Using the set temperature ▲ / ▼ buttons, set 01 to the item code (DN).
   (Setup of lighting time of filter sign)
7. The contents of the displayed setup data in this time should be agreed with the contents in the previous memorandum in **❒1**.
   1) If data disagree, change the displayed setup data to that in the previous memorandum by the timer time ▲ / ▼ buttons, and then push SET button. (OK when the display goes on.)
   2) There is nothing to do when data agrees.
8. Using the set temperature ▲ / ▼ buttons, change the item code (DN).
   As same as the above, check the contents of the setup data and then change them to data contents in the previous memorandum.
9. Then repeat the procedure 7. and 8.
10. After completion of setup, push ⌀ button to return the status to the usual stop status. **6**
    (Approx. 1 minute is required to start handling of the remote controller.)

* 01 to 9F are provided in the item code (DN).
On the way of operation, DN No. may come out.
When data has been changed by mistake and SET button has been pushed, the data can be returned to the data before change by pushing CL button if the item code (DN) was not yet changed.



Memorandum for setup contents (Item code table (Example))

DN	Item	Memo	At shipment
01	Filter sign lighting time		According to type
02	Dirty state of filter		0000: Standard
03	Central control address		0099: Unfixed
06	Heating suction temp shift		0002: +2°C (Floor type: 0)
0F	Cooling only		0000: Shared for cooling/heating
10	Type		According to model type
11	Indoor unit capacity		According to capacity type
12	Line address		0099: Unfixed
13	Indoor unit address		0099: Unfixed
14	Group address		0099: Unfixed
19	Flap type (Adjustment of air direction)		According to type
1E	Temp difference of automatic cooling/ heating selecting control points		0003: 3 deg (Ts ± 1.5)
28	Automatic reset of power failure		0000: None
2A	Option		0002:
2b	Thermo output selection (T10 ‡B)		0000: Thermo ON
32	Sensor selection		0000: Body sensor
5d	High ceiling selection		0000: Standard
60	Timer set (Wired remote controller)		0000: Available
8b	Correction of high heat feeling		0000: None

Type

Item code [10]

Setup data	Type	Abbreviated name
0038	4-way air discharge cassette	**RAV-SM1100/1400UT-E**

Indoor unit capacity

Item code [11]

Setup data	Model
0000*	Invalid
0015	110
0017	140

* Initial setup value of EEPROM installed on the service P.C. board

10. SETUP AT LOCAL SITE AND OTHERS

10-1. Indoor Unit

10-1-1. Test Run Setup on Remote Controller

<Wired remote controller>

1. When pushing button on the remote controller for 4 seconds or more, “TEST” is displayed on LC display. Then push button.
   - “TEST” is displayed on LC display during operation of Test Run.
   - During Test Run, temperature cannot be adjusted but air volume can be selected.
   - In heating and cooling operation, a command to fix the Test Run frequency is output.
   - Detection of error is performed as usual. However, do not use this function except case of Test Run because it applies load on the unit.
2. Use either heating or cooling operation mode for [TEST].

   NOTE : The outdoor unit does not operate after power has been turned on or for approx. 3 minutes after operation has stopped.
3. After a Test Run has finished, push button again and check that [TEST] on LC display has gone off. (To prevent a continuous test run operation, 60-minutes timer release function is provided to this remote controller.)

<Wireless remote controller> (Option for 4-way air discharge cassette type)

1. Turn off power of the unit.

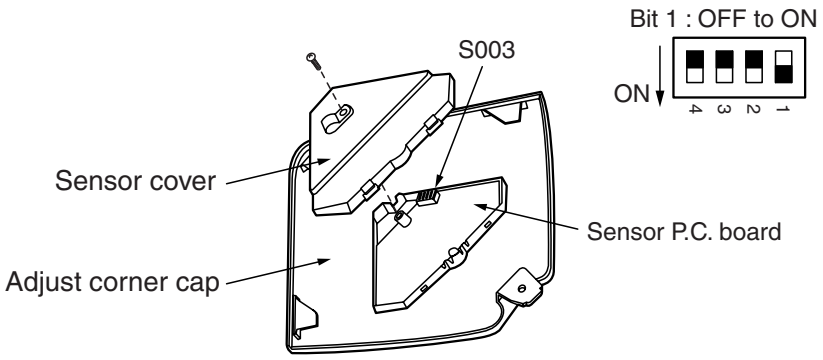
   Remove the adjuster attached with sensors from the ceiling panel. For removing, refer to the Installation manual attached to the ceiling panel. (Be careful to handle the adjuster because cables are connected to the sensor.) Remove the sensor cover from the adjuster. (1 screw)
2. Change ON of Bit [1: TEST] of the sensor P.C. board switch [S003] to OFF.

   Mount the sensor cover and mount the adjuster with sensor to the ceiling panel.

   Turn on power of the unit.
3. Push button on the wireless remote controller and select [COOL] or [HEAT] operation mode using button. (All the display lamps of sensors on the wireless remote controller flash during Test Run.)
   - Do not perform Test Run operation in other modes than [HEAT] / [COOL] mode.
   - Detection of error is performed as usual.
4. After Test Run operation, push button to stop the operation.
5. Turn off power of the unit.

   Return Bit [1] of the sensor P.C. board switch [S003] to the original position. (ON → OFF)

   Mount the adjuster with sensors to the ceiling panel.



10-1-2. Setup to Select Function

<Procedure> Use this function while the indoor unit stops.

1 **Push (SET), (CL), and (wrench) buttons concurrently for 4 seconds or more.**
The unit No. displayed at the first time indicates the indoor unit address of the master unit in the group control.
In this time, fan and flap of the selected indoor unit operate.

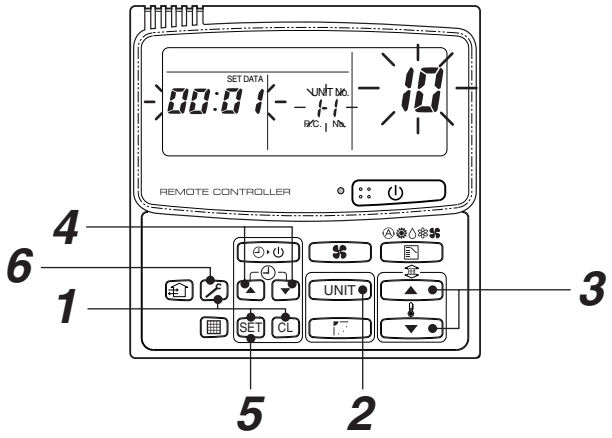
2 **Every pushing (UNIT) button, the indoor unit numbers in the group control are displayed successively. In this time, fan and flap of the selected indoor unit only operate.**

3 **Using the set temperature (▲) / (▼) buttons, set the item code (DN).**

4 **Using the timer time (▲) / (▼) buttons, select the setup data.**

5 **Push (SET) button. (OK if display goes on.)**
- To change the selected indoor unit, proceed to ***2***.
- To change the item to be set, proceed to ***3***.

6 **Pushing (wrench) button returns the status to usual stop status.**



<Operation procedure>

1 → ***2*** → ***3*** → ***4*** → ***5*** → ***6*** END

Item No. (DN) table (Selection of function)

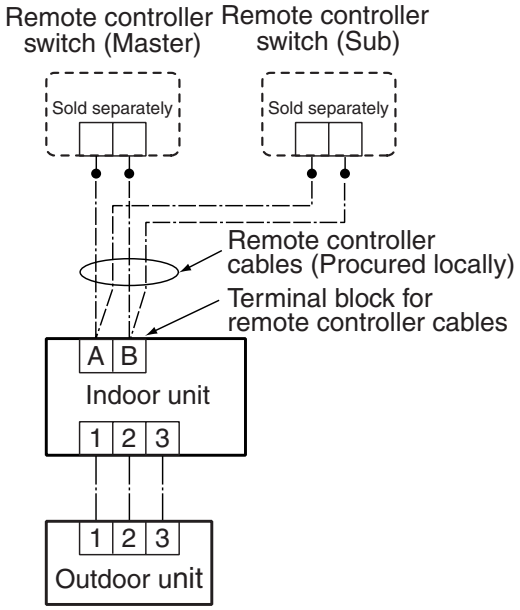
DN	Item	Description	At shipment
01	Filter sign lighting time	0000 : None 0001 : 150H 0002 : 2500H 0003 : 5000H 0004 : 10000H 0005 : Clogged sensor used	According to type
02	Dirty state of filter	0000 : Standard 0001 : High degree of dirt (Half of standard time)	0000 : Standard
03	Central control address	0001 : No.1 unit to 0064 : No.64 unit 0099 : Unfixed	0099 : Unfixed
06	Heating suction temp shift	0000 : No shift 0001 : +1°C 0002 : +2°C to 0010 : -10°C (Up to recommendation + 6)	0002 : +2°C (Floor type 0000: 0°C)
0F	Cooling only	0000 : Heat pump 0001 : Cooling only (No display of [AUTO] [HEAT])	0000 : Shared for cooling/heating
10	Type	0000 : (Air discharge cassette 1) 0001 : (Air discharge cassette 4) to 0037	According to model type
11	Indoor unit capacity	0000 : Unfixed 0001 to 0034	According to capacity type
12	Line address	0001 : No.1 unit to 0030 : No.30 unit	0099 : Unfixed
13	Indoor unit address	0001 : No.1 unit to 0064 : No.64 unit	0099 : Unfixed
14	Group address	0000 : Individual 0001 : Master of group 0002 : Sub of group	0099 : Unfixed
19	Flap type (Adjustment of air direction)	0000 : No flap 0001 : Swing only 0004 : 4-way	According to type
1E	Temp difference of automatic cooling/heating mode selection COOL → HEAT, HEAT →COOL	0000 : 0 deg to 0010 : 10 deg (For setup temperature, reversal of COOL/HEAT by ± (Data value)/2)	0003 : 3 deg (Ts±1.5)
28	Automatic reset of power failure	0000 : None 0001 : Reset	0000 : None
2A	Option		0002 : Default
2b	Thermo output selection (T10 ③)	0000 : Indoor thermo ON 0001 : Output of outdoor comp-ON receiving	0000: Thermo. ON
2E	Option		0000 : Default
30	Option		0000 : Default
31	Option		0000 : Default
32	Sensor selection	0000 : Body TA sensor 0001 : Remote controller sensor	0000 : Body sensor
40	Option		0003 : Default
5d	High ceiling selection (Air volume selection)	0000 : Standard filter 0001 : Oil guard, Super-long life, Optical regenerative deodorization 0003 : High performance (65%), High performance (90%), High antibacterial performance (65%)	0000 : Standard
60	Timer set (Wired remote controller)	0000 : Available (Operable) 0001 : Unavailable (Operation prohibited)	0000 : Available
8b	Correction of high heat feeling	0000 : None 0001 : Correction	0000 : None

10-1-3. Cabling and Setting of Remote Controller Control

2-remote controller control (Controlled by two remote controllers)

One or multiple indoor units are controlled by two remote controllers.
(Max. 2 remote controllers are connectable.)

- **1 indoor unit is controlled by 2 remote controllers**



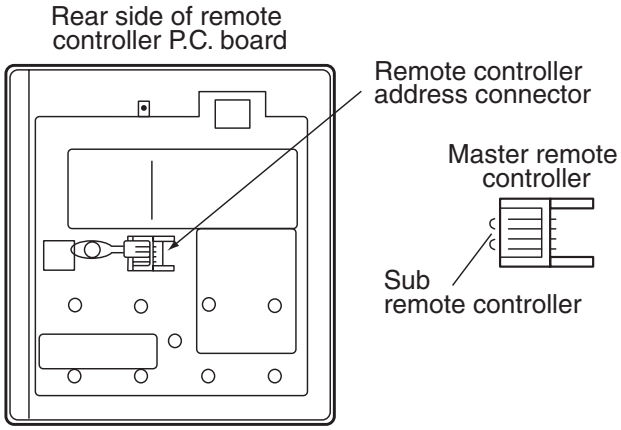
(Setup method)

One or multiple indoor units are controlled by two remote controllers.
(Max. 2 remote controllers are connectable.)

<Wired remote controller>

How to set wired remote controller to sub remote controller

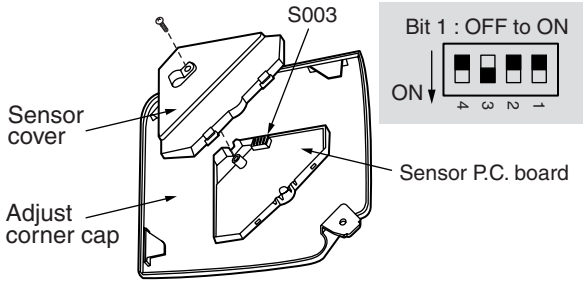
Insert the remote controller address connector provided on the rear side of the remote controller switch P.C. board into Sub in exchange for Master.


Rear side of remote controller P.C. board
Remote controller address connector
Master remote controller
Sub remote controller

<Wireless remote controller>

How to set wireless remote controller to sub remote controller

Change OFF of Bit [3: Remote controller Sub/ Master] of switch S003 to ON.



[Operation]

1. The operation contents can be changed by Last-push-priority.
2. Use a timer on either Master remote controller or Sub remote controller.

10-1-4. Monitor Function of Remote Controller Switch

■ **Call of sensor temperature display**

<Contents>

Each sensor temperature of the remote controller, indoor unit, and outdoor unit can become known by calling the service monitor mode from the remote controller.

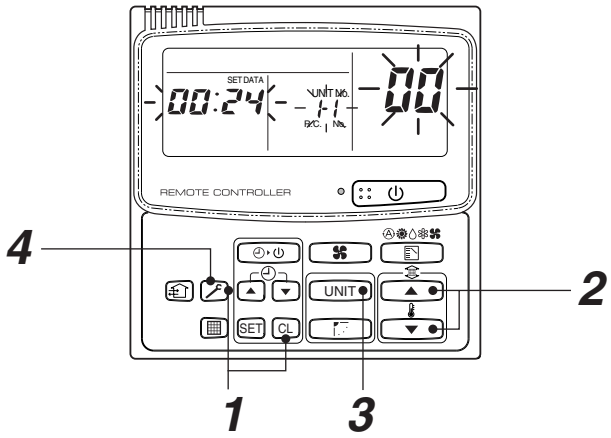
<Procedure>

1 **Push CL + buttons simultaneously for 4 seconds or more to call the service monitor mode.**

The service monitor goes on, the master indoor unit No. is displayed, and then temperature of the **item code** *00* is displayed.

2 **Push the temperature setup ▲ / ▼ buttons to select the sensor No. (Item code) of the sensor to be monitored.**

The sensor numbers are described below:



<Operation procedure>

1 → ***2*** → ***3*** → ***4***

Returned to usual display

	Item code	Data name		Item code	Data name
Indoor unit data	00	Room temp (under control) *1	Outdoor unit data	60	Heat exchanger temp TE
	01	Room temp (remote controller)		61	Outside temp TO
	02	Indoor suction temp		62	Discharge temp TD
	03	Indoor coil temp (TCJ)		63	Suction temp TS
	04	Indoor coil temp (TC)		64	—
				65	Heat sink temp THS

*1 Only master unit in group control

3 **The temperature of indoor units and outdoor unit in a group control can be monitored by pushing UNIT button to select the indoor unit to be monitored.**

4 **Pushing button returns the display to usual display.**

■ **Calling of error history**

<Contents>

The error contents in the past can be called.

<Procedure>

1 **Push CL + ✎ buttons simultaneously for 4 seconds or more to call the service check mode.**

Service Check goes on, the **item code** *01* is displayed, and then the content of the latest alarm is displayed. The number and error contents of the indoor unit in which an error occurred are displayed.

2 **In order to monitor another error history, push the set temperature ▲ / ▼ buttons to change the error history No. (Item code).**

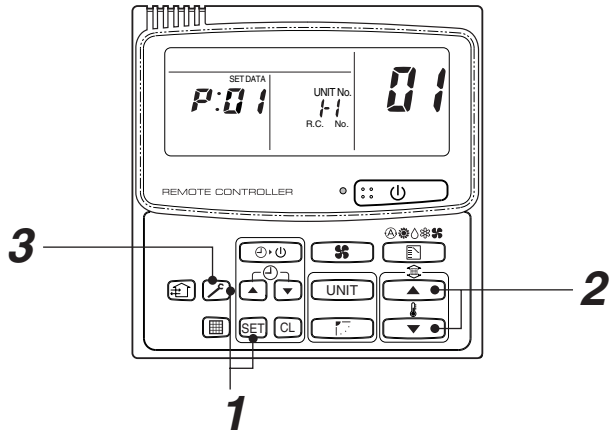
Item code *01* (Latest) → **Item code** *04* (Old)

NOTE : Four error histories are stored in memory.

3 **Pushing ✎ button returns the display to usual display.**

<Requirement>

Do not push CL button, otherwise all the error histories of the indoor unit are deleted.



<Operation procedure>

1 → ***2*** → ***3***

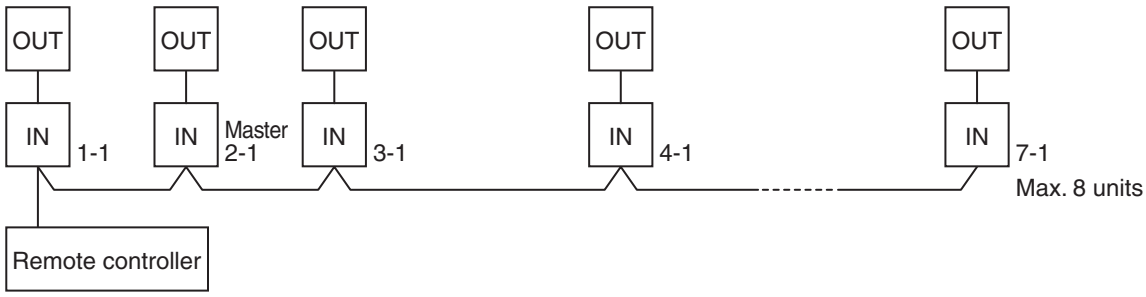
Returned to usual display

(Group control operation)

In a group control, operation of maximum 8 indoor units can be controlled by a remote controller.

The indoor unit connected with outdoor unit (Individual/Master of twin) controls room temperature according to setting on the remote controller.

<System example>



(1) Display range on remote controller

The setup range (Operation mode/Air volume select/Setup temp) of the indoor unit which was set to the master unit is reflected on the remote controller.

(2) Address setup

Turn on power of the indoor unit to be controlled in a group within 3 minutes after setting of automatic address.

If power of the indoor unit is not turned on within 3 minutes (completion of automatic address setting), the system is rebooted and the automatic address setting will be judged again.

1) Connect 3 In/Out cables surely.
2) Check line address/indoor address/group address of the unit one by one.
3) The unit No. (line/indoor gout address) which have been set once keep the present status as a rule if the unit No. is not duplicated with one of another unit.

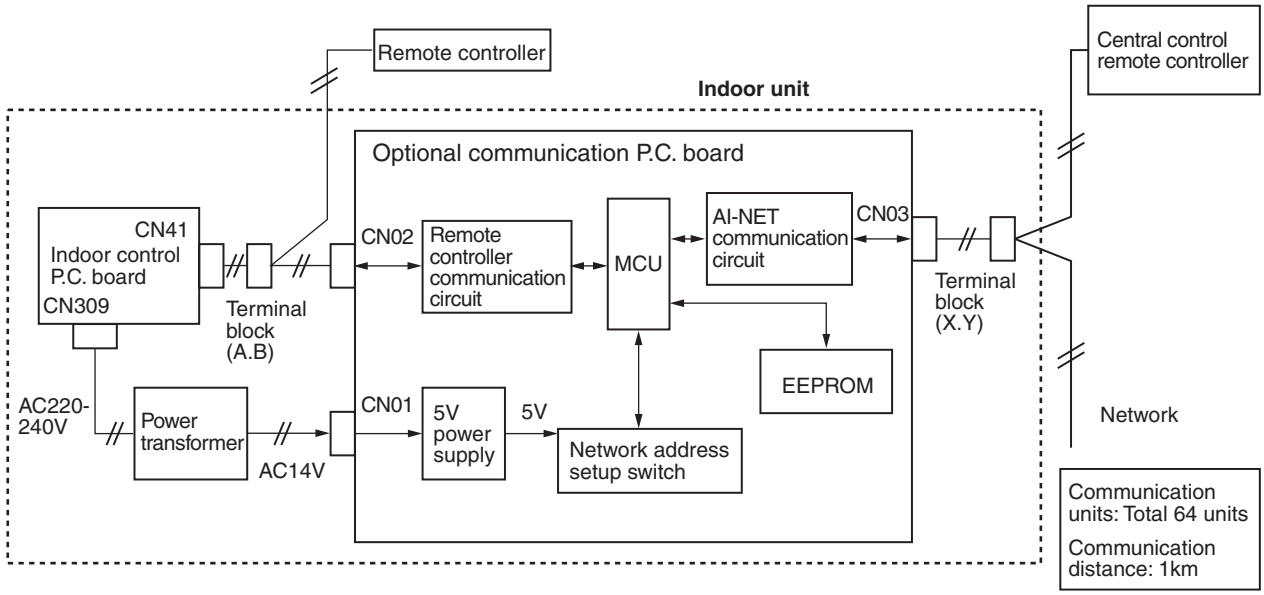
10-2. Network Adapter

Model name: TCB-PCNT20E

10-2-1. Function

A network adapter is an optional P.C. board to connect the indoor unit to AI net (Central control remote controller).

10-2-2. Microcomputer Block Diagram



10-2-3. Network Address Setup Switch (SW01)

No.	Item	Setup contents
1	LSB	1 2 3 4 5 6
2	Central control address	× × × × × × : No.1 unit × : Switch OFF
3		○ × × × × × : No.2 unit ○: Switch OFF
4		:
5		○ ○ ○ ○ ○ × : No.63 unit
6	MSB	○ ○ ○ ○ ○ ○ : No.64 unit
7	Setup availability from remote controller	Switch OFF : Setup available from remote controller
8		Switch ON : Setup unavailable from remote controller

10-2-4. LED Display Specification

LED No.	Function	Go on	Go off
D01 (Red)	Communication status: Remote controller	During communication	No communication (including communication error)
D02 (Red)	Communication status: Center	During communication	No communication (including communication error)
D03 (Red)	Operation status of air conditioner	Running	Stop
D04 (Red)	Air conditioner error	Error	Normal

* For positions of LED, refer to P.C. board external view.

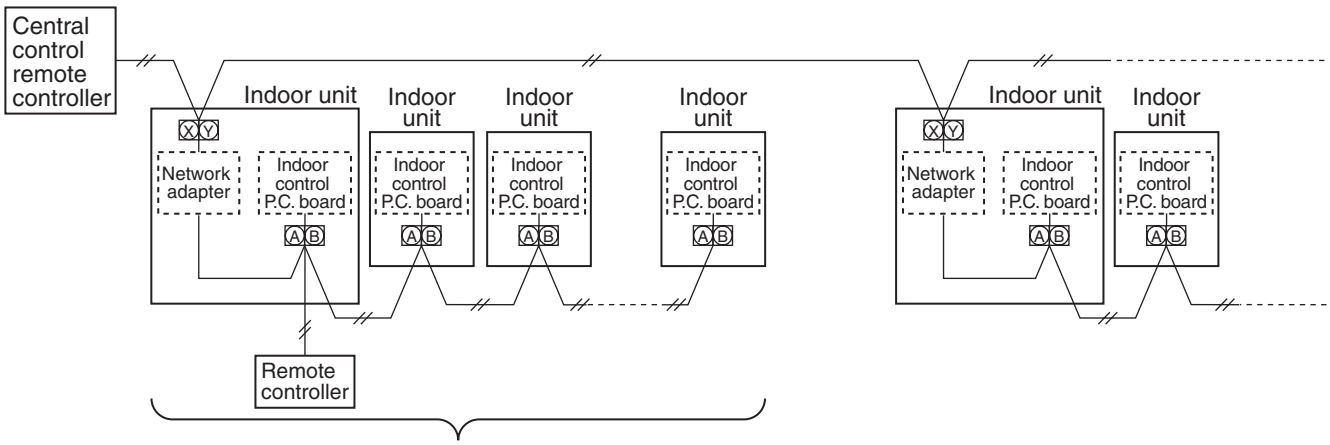
10-2-5. Communication Cable Specifications

No.	Communication circuit	Communication cable specifications	
1	Remote controller communication side	Cable	Neutral 2-cable type
		Cable type	CVV (JIS C3401) Controlling vinyl insulation vinyl seal cable VCTF (JIS C3306) Vinyl cab tire round type cord VCT (JIS C3401) 600V vinyl cab tire cable VVR (JIS C3401) Vinyl insulation seal cable round type MVVS Cable with net shielding for instrumentation CPEVS Shielded polyethylene insulation vinyl seal cable
		Cable dia.	0.5 to 2.0 mm²
		Cable length	Total cable length Max. 500m (Up to 400m when there is wireless remote controller in group)
2	AI NET side	Cable	Neutral 2-cable type
		Cable type	MVVS Cable with net shielding for instrumentation
		Cable dia.	1.25 mm² ≤ 500 m, 2.0 mm² ≤ 1 km
		Cable length	Total cable length : Up to 500m when using 1.25mm² cable, Up to 1000m when using 2.0mm² cable

10-2-6. Cable Connection

<Network cable connection>

- Install a network adapter per 1 group of the group control (including single unit control). Also install a network adapter to one of the indoor units in the group control.



Connectable indoor units per group: Up to 8 units
(1-remote controller system*)
* In case of 2-remote controllers system,
the connectable indoor units are up to 7 units.

10-3. How to Set an Address Number

When connecting indoor units to the central control remote controller by using a network adapter, it is required to set up a network address No.

- The network address No. should be agreed with the line No. of the central control remote controller.
- When the unit was shipped from the factory, the network address has been set to 1.

The following two methods to set the network address are provided.

1. How to set from the remote controller at indoor unit side

* This method is effective only when ⑦ of set switch SW01 on the network adapter P.C. board is turned off.

<Procedure> Set the network address while the unit stops.

1 **Push + buttons for 4 seconds or more.**

In the group control, the unit No RUL is displayed, and then all the indoor units in the group control are selected. In this time, fans of all the selected indoor units are turned on. (Fig. 1)
(Keep status of RUL display without pushing UNIT button.)

For the individual remote controller which is not included in a group control, the line address and the indoor unit address are displayed.

2 **Specify the item code 03 using the temperature setup / buttons.**

3 **Using the timer time / buttons, select the setup data.**

The setup data are shown in the right table (Table 1).

4 **Push SET button. (OK if display goes on)**

- To change the item to be set, return to **2**.

5 **Push button.**

The status returns to the usual stop status.

Fig. 1

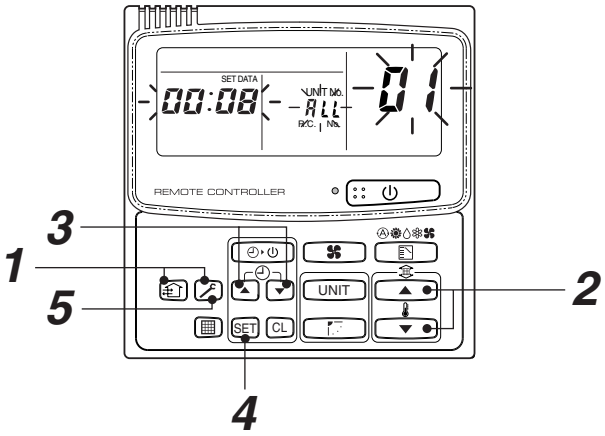


Table 1

Setup data	Network address No.
0001 0002 0003 : 0064	1 2 3 : 64
0099	Unset (Setup at shipment from factory)

2. How to set by the switch on the network adapter P.C. board

When the remote controller cannot be found or when you don't want to change setting of the network address No. from the remote controller, use the setup switch SW01 on the network adapter P.C. board (Network address No. setup switch) to set the address No.

<Procedure>

(1) Turn off the power.

(2) Turn ⑦ of the address No. setup switch SW01 to ON side. Accordingly the address No. set on the remote controller is invalidated. (See Fig. 2.)

(3) Set the network address No. with combination of ON and OFF of ⑥ to ① of the address No. setup switch SW01. The relation between combination of ON/OFF and address No. is described in Table 2. The right figure (Fig. 3) shows an example of case that the address No. is set to 16.

When the network address No. has been changed, be sure to turn of power of the central control remote controller again or to reset the remote controller using the reset hole on the operation panel of the central control remote controller.

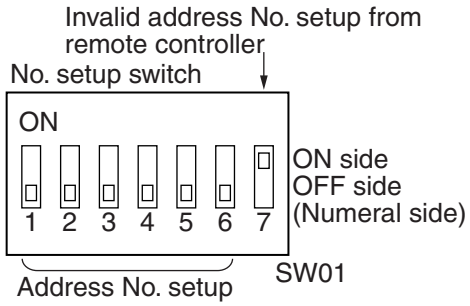


Fig. 2

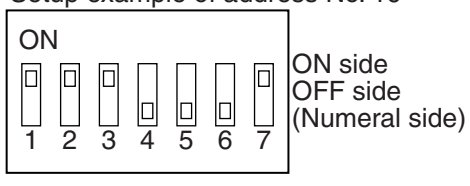


Fig. 3

Table 2 Network address No. setup table (SW01)

○ : ON side
× : OFF side

Address No.	①	②	③	④	⑤	⑥
01×○	×	×	×	×	×	×
02	○	×	×	×	×	×
03	×	○	×	×	×	×
04	○	○	×	×	×	×
05	×	×	○	×	×	×
06	○	×	○	×	×	×
07	×	○	○	×	×	×
08	○	○	○	×	×	×
09	×	×	×	○	×	×
10	○	×	×	○	×	×
11	×	○	×	○	×	×
12	○	○	×	○	×	×
13	×	×	○	○	×	×
14	○	×	○	○	×	×
15	×	○	○	○	×	×
16	○	○	○	○	×	×
17	×	×	×	×	○	×
18	○	×	×	×	○	×
19	×	○	×	×	○	×
20	○	○	×	×	○	×
21	×	×	○	×	○	×
22	○	×	○	×	○	×
23	×	○	○	×	○	×
24	○	○	○	×	○	×
25	×	×	×	○	○	×
26	○	×	×	○	○	×
27	×	○	×	○	○	×
28	○	○	×	○	○	×
29	×	×	○	○	○	×
30	○	×	○	○	○	×
31	×	○	○	○	○	×
32	○	○	○	○	○	×

Address No.	①	②	③	④	⑤	⑥
33	×	×	×	×	×	○
34	○	×	×	×	×	○
35	×	○	×	×	×	○
36	○	○	×	×	×	○
37	×	×	○	×	×	○
38	○	×	○	×	×	○
39	×	○	○	×	×	○
40	○	○	○	×	×	○
41	×	×	×	○	×	○
42	○	×	×	○	×	○
43	×	○	×	○	×	○
44	○	○	×	○	×	○
45	×	×	○	○	×	○
46	○	×	○	○	×	○
47	×	○	○	○	×	○
48	○	○	○	○	×	○
49	×	×	×	×	○	○
50	○	×	×	×	○	○
51	×	○	×	×	○	○
52	○	○	×	×	○	○
53	×	×	○	×	○	○
54	○	×	○	×	○	○
55	×	○	○	×	○	○
56	○	○	○	×	○	○
57	×	×	×	○	○	○
58	○	×	×	○	○	○
59	×	○	×	○	○	○
60	○	○	×	○	○	○
61	×	×	○	○	○	○
62	○	×	○	○	○	○
63	×	○	○	○	○	○
64	○	○	○	○	○	○

Requirement in Service

When using this product as service part to replace the network adapter P.C. board, be sure to match the setup of the setup switch SW01 (Network address No. setup switch) on the network adapter P.C. board with the P.C. board setup before replacement.

10-4. Display and Operation of Main Remote Controller and Central Control Remote Controller

1. Turn on all the power supplies of the air conditioner, and then turn on power of the central control remote controller (Line 16 RBC-SXC1P, Line 64 TCB-SC641). If both power supplies are simultaneously turned on or if they are turned on reversely, the check code [97] may be temporarily displayed on the central remote controller. When settings of connecting cables and central control address are correct, the connected air conditioner is displayed on the central control remote controller.
2. As shown in the following table, there is difference of LCD between main remote controller (RBC-AMT21) and the central control remote controller and also there are restriction and others of operation.

	Item	Contents		Cautions
		Main remote controller	Central control remote controller	
1	Air volume selection	[SPEED] [AUTO] [HH] [H] [L]	[VOL] [AUTO] [H] [M] [L]	Display of air speed selection differs.
		[SPEED] [HH]	[VOL] [FIX]	In duct type Air speed becomes [H] and [FIX].
2	Air speed selection in FAN mode	[SPEED] [HH] [H] [L]	[VOL] [AUTO] [H] [M] [L]	When handling main remote controller, [AUTO] is not displayed. If [AUTO] is selected at center side, [AUTO] is displayed on the main remote controller. In this time, the air speed becomes [HH].
3	Air speed selection in DRY mode	[SPEED] [AUTO] [HH] [H] [L]	[VOL] [AUTO]	On the central remote controller, only [AUTO] is displayed. The display on the main remote controller changes to [AUTO] by changing the setup temperature/louver, and the air speed is automatically selected.
4	Air direction adjustment	[SWING] and air direction adjustment	[LOUVER]	On the central remote controller, only [LOUVER] is displayed. It is displayed while flap is swinging, and the setup operation of [LOUVER] becomes selection of swing ON/OFF. To set up the air direction, use the main remote controller.
		(No display)	Manual operation for [LOUVER]	In a model type without air direction adjustment
5	Check button	Test run (4 seconds)	Check code display and check reset (3 seconds)	The function of long-pushing operation for the check button differs. If the check reset operation on the central remote controller is performed during operation of air conditioner, the operation stops once, and then the operation restarts. (Error of air conditioner is cleared.)
6	Check code	3-digits display (alpha-bet + 2-digits numeral)	2-digits display (alpha-bet or numeral)	Display of check code differs. Ex. : Float switch operation Main side: [P10] Center side: [0b]

3. When using the remote controller together with the former one (RBC-AM1, AT1), the display on the main remote controller differs if [Last-push priority/Center/Operation Prohibited] is selected from the central control remote controller.

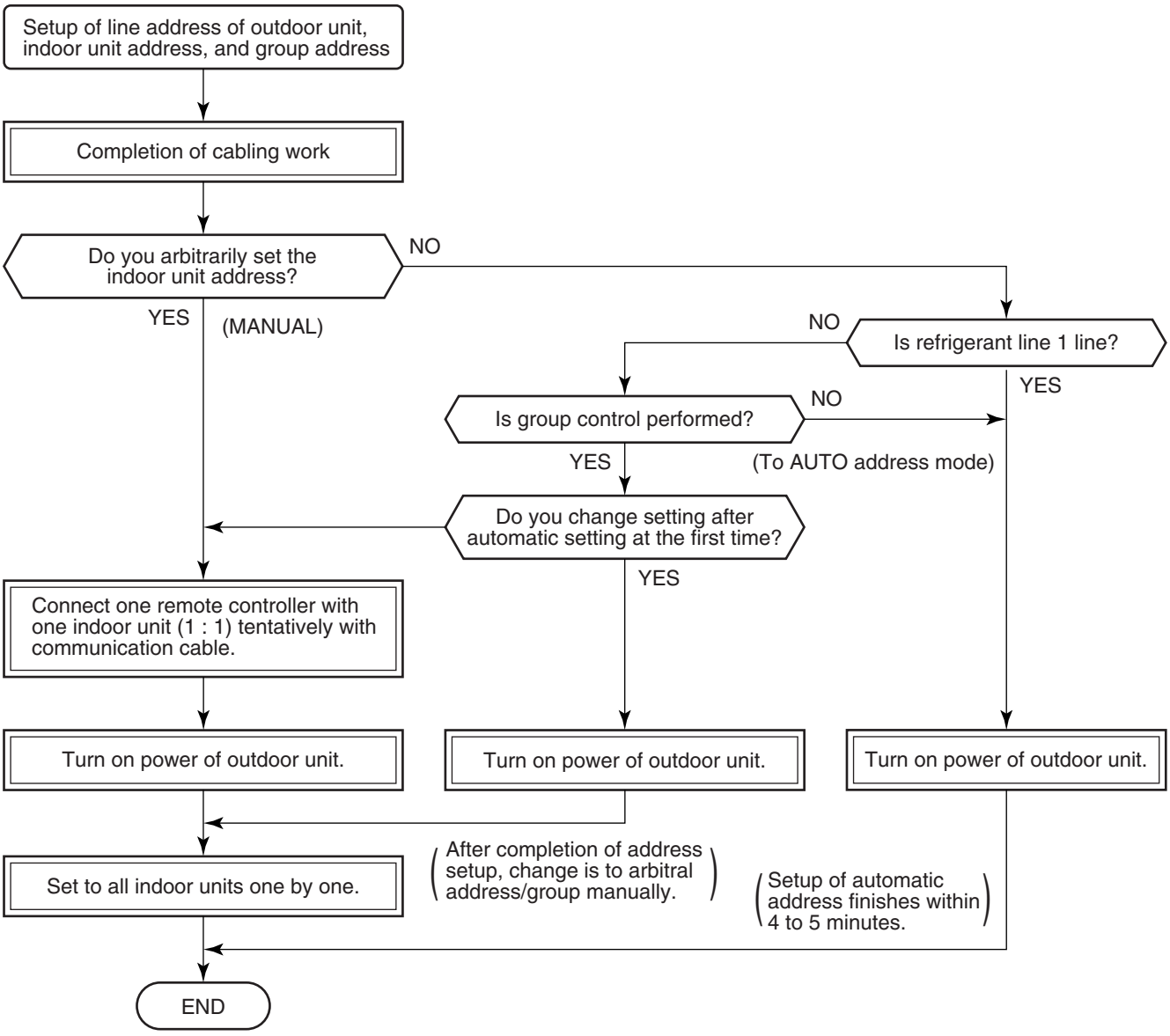
	Item	Contents		Remarks
		New remote controller (RBC-AMT21)	Former remote controller (RBC-AM1, AT1)	
1	Last-push priority	(No display)	(No display)	All the settings and ON/OFF operations are available.
2	Center	[CENTER] goes on	[CENTER] goes on	The setup contents on the central control remote controller are fixed, and only ON/OFF operation and timer setup operation are available on the main remote controller.
3	Operation prohib-ited		[CENTER] flashes	The setup contents on the central control remote controller are fixed, and the air conditioner stops. Operation from the main remote controller is unavailable.

11. ADDRESS SETUP

11-1. Address Setup

<Address setup procedure>

When an outdoor unit and an indoor unit are connected, or when an outdoor unit is connected to each indoor unit respectively in the group operation even if multiple refrigerant lines are provided, the automatic address setup completes with power-ON of the outdoor unit. The operation of the remote controller is not accepted while automatic address works. (Approx. 4 to 5 minutes)


Setup of line address of outdoor unit, indoor unit address, and group address
Completion of cabling work
Do you arbitrarily set the indoor unit address?
NO
YES
(MANUAL)
NO
Is refrigerant line 1 line?
YES
Is group control performed?
NO
YES
(To AUTO address mode)
Do you change setting after automatic setting at the first time?
YES
Connect one remote controller with one indoor unit (1 : 1) tentatively with communication cable.
Turn on power of outdoor unit.
Turn on power of outdoor unit.
Turn on power of outdoor unit.
Set to all indoor units one by one.
After completion of address setup, change is to arbitral address/group manually.
Setup of automatic address finishes within 4 to 5 minutes.
END

- When the following addresses are not stored in the neutral memory (IC10) on the indoor P.C. board, a test run operation cannot be performed. (Unfixed data at shipment from factory)

	Item code	Data at shipment	Setup data range
Line address	12	0099	0001 (No. 1 unit) to 0030 (No. 30 unit)
Indoor unit address	13	0099	0001 (No. 1 unit) to 0030 (No. 30 unit) Max. value of indoor units in the identical refrigerant line (Double twin = 4)
Group address	14	0099	0000 : Individual (Indoor units which are not controlled in a group) 0001 : Master unit (1 indoor unit in group control) 0002 : Sub unit (Indoor units other than master unit in group control)

11-2. Address Setup & Group Control

<Terminology>

Indoor unit No. : N - n = Outdoor unit line address N (Max. 30) - Indoor unit address n (Max. 64)

Group address : 0 = Individual (Not group control)
1 = Master unit in group control
2 = Sub unit in group control

Master unit (= 1) : The representative of multiple indoor units in group operation sends/receives signals to/from the remote controllers and sub indoor units. (* It has no relation with an indoor unit which communicates serially with the outdoor units.)

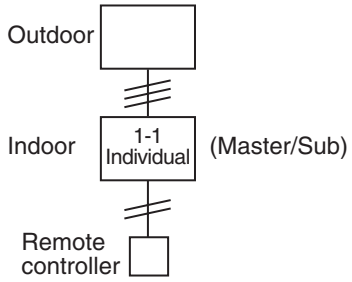
The operation mode and setup temperature range are displayed on the remote controller LCD. (Except sir direction adjustment of flap)

Sub unit (= 2) : Indoor units other than master unit in group operation

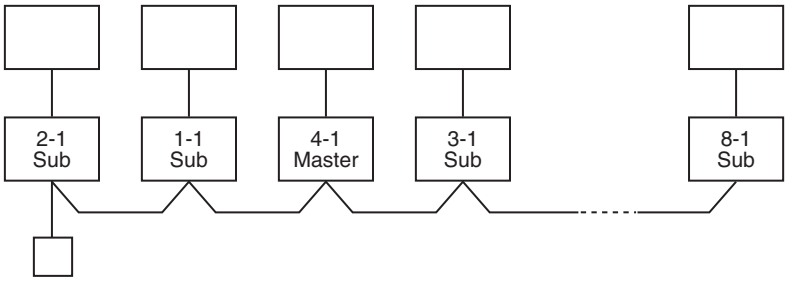
Basically, sub units do not send/receive signals to/from the remote controllers.
(Except errors and response to demand of service data)

11-2-1. System configuration

1. Single



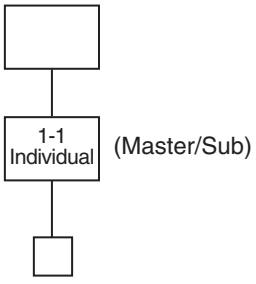
2. Single group operation



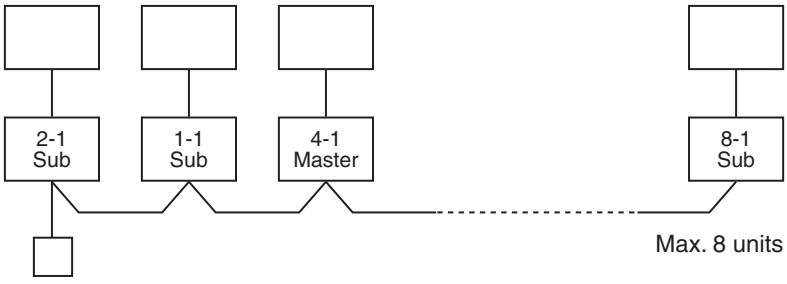
11-2-2. Automatic address example from unset address (No miscabling)

1. Standard (One outdoor unit)

1) Single



2) Gr operation
(Multiple outdoor units = Miltiple indoor units only with serial communication)



Only turning on source power supply (Automatic completion)

11-3. Address Setup

In case that addresses of the indoor units will be determined prior to piping work after cabling work

(Manual setting from remote controller)

<Address setup procedure>

- Set an indoor unit per a remote controller.
- Turn on power supply.

1 **Push SET + CL + button simultaneously for 4 seconds or more.**

2 **(← Line address) Using the temperature setup ▲ / ▼ buttons, set 12 to the item code.**

3 **Using timer time ▲ / ▼ buttons, set the line address.**

4 **Push SET button.** (OK when display goes on.)

5 **(← Indoor unit address) Using the temperature setup ▲ / ▼ buttons, set 13 to the item code.**

6 **Using timer time ▲ / ▼ buttons, set 1 to the line address.**

7 **Push SET button.** (OK when display goes on.)

8 **(← Group address) Using the temperature setup ▲ / ▼ buttons, set 14 to the item code.**

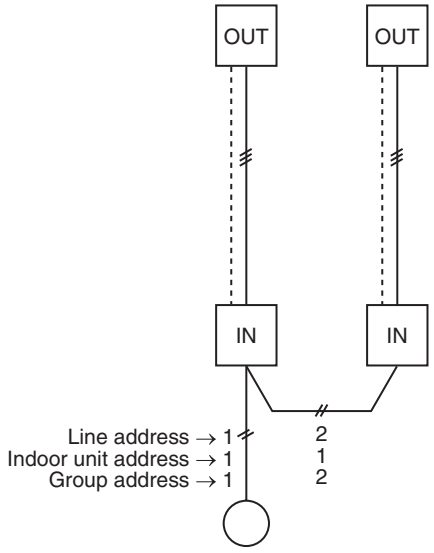
9 **Using timer time ▲ / ▼ buttons, set 0000 to Individual, 0001 to Master unit, and 0002 to sub unit.**

10 **Push SET button.** (OK when display goes on.)

11 **Push button.**

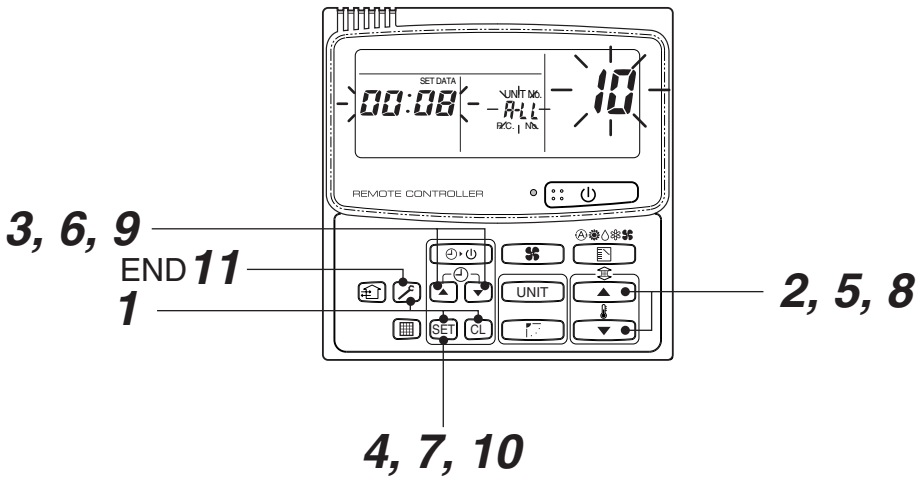
Setup completes.
(The status returns to the usual stop status.)

(Example of 2-lines cabling)
(Real line: Cabling, Broken line: Refrigerant pipe)



For the above example, perform setting by connecting singly the wired remote controller without remote controller inter-unit cable.

Group address
Individual : 0000
Master unit : 0001
Sub unit : 0002
} In case of group control



<Operation procedure>

1→ 2→ 3→ 4→ 5→ 6→ 7→ 8→ 9→ 10→ 11 END

■ **Confirmation of indoor unit No. position**

1. To know the indoor unit addresses though position of the indoor unit body is recognized

- In case of individual operation (Wired remote controller : indoor unit = 1 : 1)
  (Follow to the procedure during operation)

<Procedure>

1 **Push ⏻ button if the unit stops.**

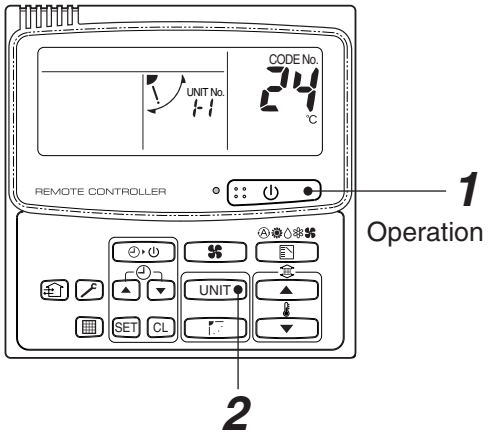
2 **Push UNIT button.**

Unit No. 1-1 is displayed on LCD.

(It disappears after several seconds.)

The displayed unit No. indicate line address and indoor unit address.

(When other indoor units are connected to the identical remote controller (Group control unit), other unit numbers are also displayed every pushing UNIT button.



<Operation procedure>

1 → ***2*** END

2. To know the position of indoor unit body by address

- To confirm the unit No. in the group control
  (Follow to the procedure during operation) (in this procedure, the indoor units in group control stop.)

<Procedure>

The indoor unit numbers in the group control are successively displayed, and fan, flap, and drain pump of the corresponding indoor unit are turned on. (Follow to the procedure during operation)

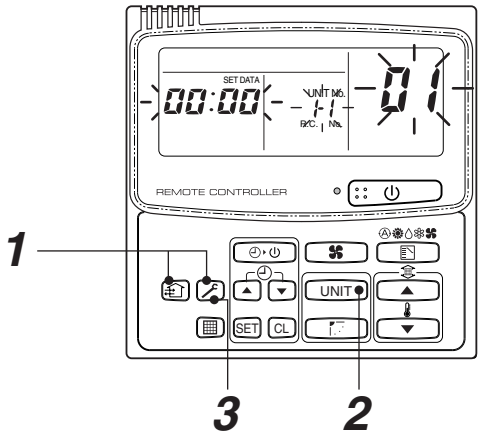
1 **Push ⏏ and ✎ buttons simultaneously for 4 seconds or more.**

- Unit No. ALL is displayed.
- Fans and flaps of all the indoor units in the group control operate.

2 **Every pushing UNIT button, the unit numbers in the group control are successively displayed.**

- The unit No. displayed at the first time indicates the master unit address.
- Fan and flap of the selected indoor unit only operate.

3 **Push ✎ button to finish the procedure. All the indoor units in the group control stop.**



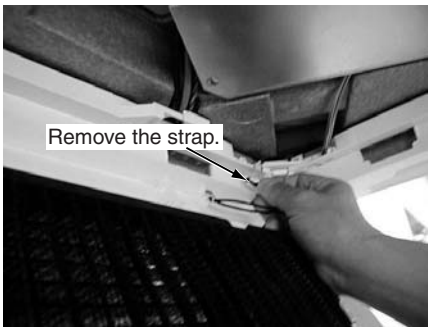
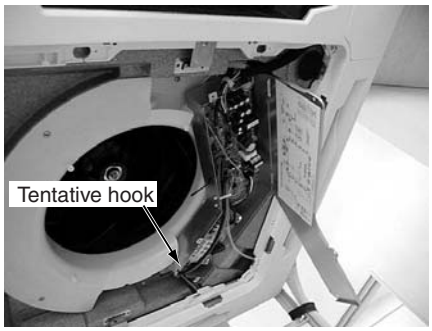
<Operation procedure>

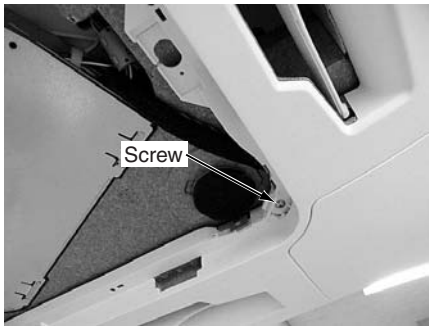
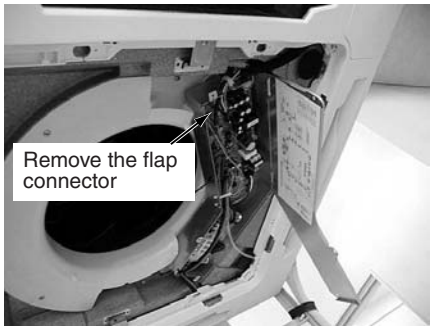
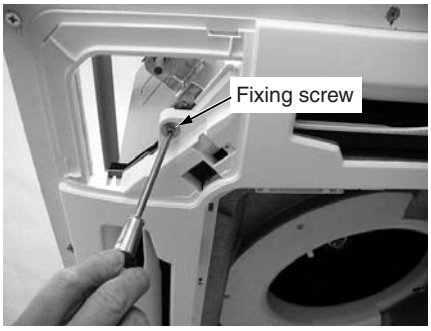
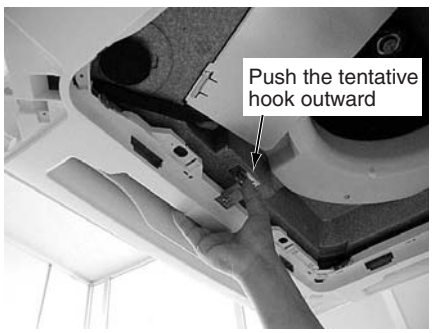
1 → ***2*** → ***3*** END

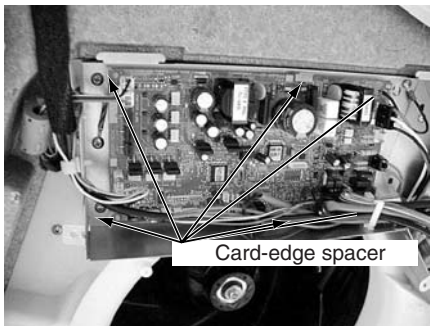
12. DETACHMENTS

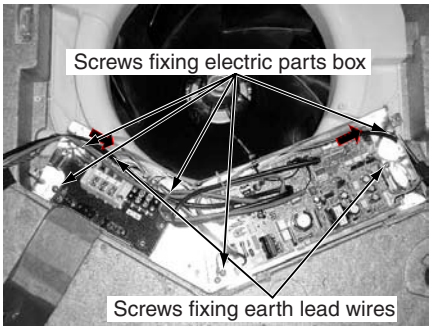
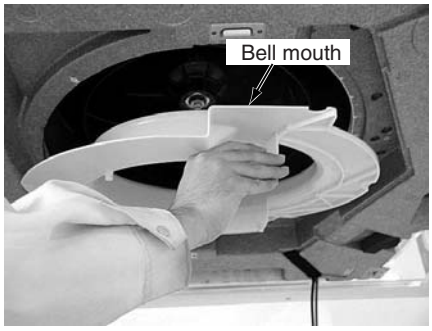
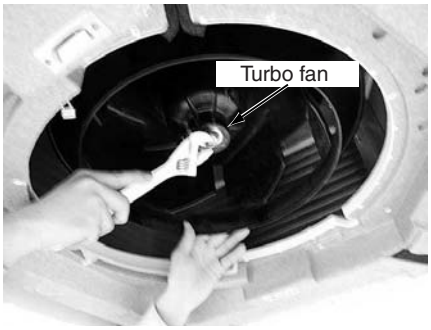
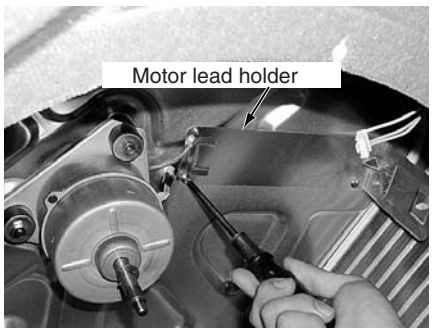
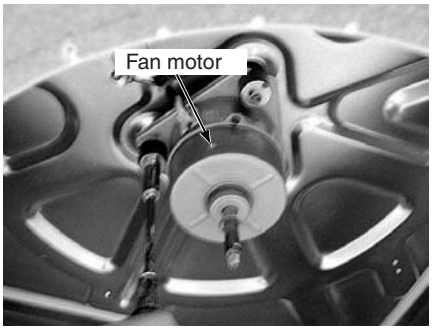
12-1. Indoor Unit

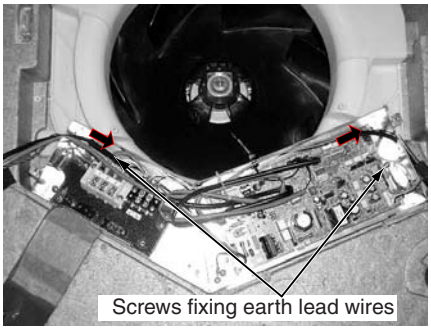
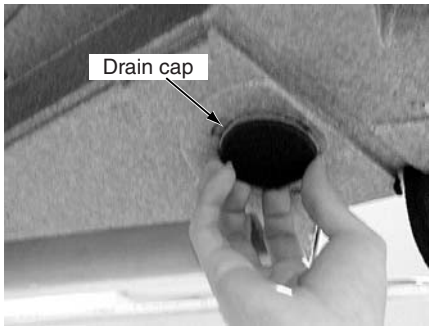
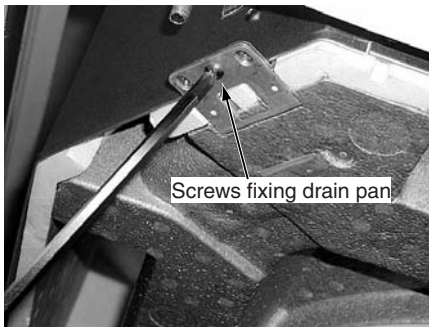
RAV-SM1100UT-E, SM1400UT-E

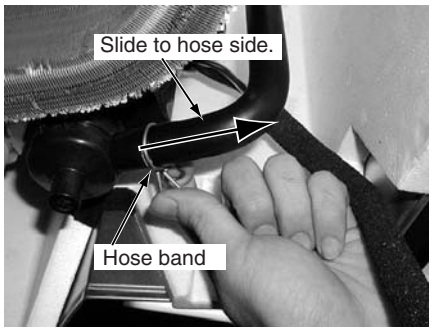
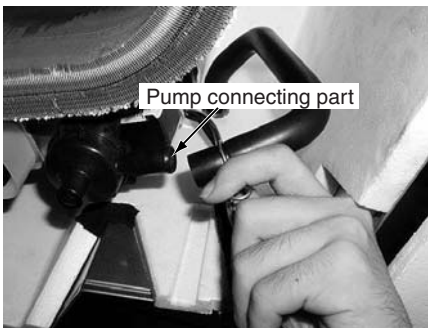
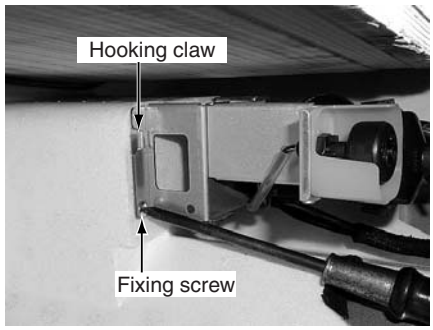
No.	Part name	Procedure	Remarks
①	Suction grille	**REQUIREMENT** Never forget to put on the gloves at disassembling work, otherwise an injury will be caused. **1. Detachment** 1) Stop operation of the air conditioner, and then turn off switch of the breaker. 2) Hang down the suction grille while sliding two knobs of the suction grille inward. 3) Remove a strap connecting the panel and the suction grille to remove the suction grille. **2. Attachment** 1) Hang the suction grille to the panel. 2) Attach the strap of the suction grille to the panel as before. 3) Close the suction grille, slide the knobs outward, and then fix it.	 
②	Electric parts cover	**1. Detachment** 1) Perform work of item 1. of ①. 2) Remove screws fixing the electric parts cover. (Ø4 x 10, 3 pcs.) 3) Remove the electric parts cover from the tentative hook, and then open the cover. **2. Attachment** 1) Close the electric parts cover and hang the cover hole to the tentative hook. 2) Tighten the fixing screws. (Ø4 x 10, 3 pcs.)	 

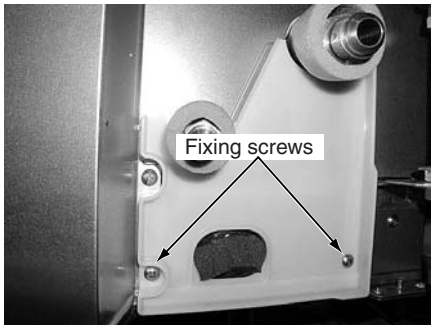
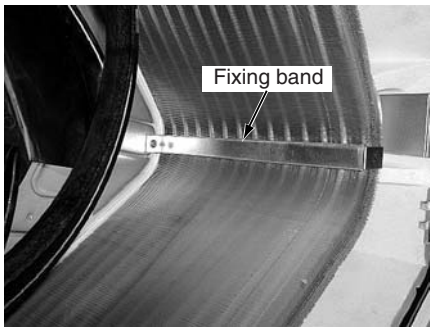
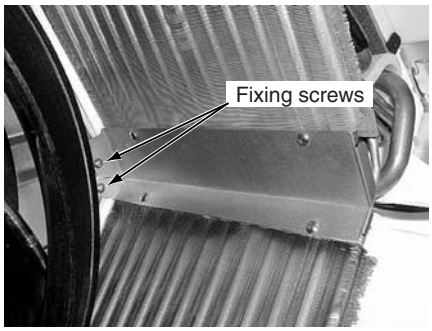
No.	Part name	Procedure	Remarks
③	Adjust corner cap	**1. Detachment** 1) Perform work of item 1. of ①. 2) Remove screws at 4 corners of the suction port. (Ø4 x 10, 4 pcs.) 3) Push the knob outward and remove the adjust corner cap by sliding it. **2. Attachment** 1) Mount the adjust corner cap by sliding it inward. 2) Tighten screws at 4 corners of the suction port. (Ø4 x 10, 4 pcs.)	
④	Ceiling panel	**1. Detachment** 1) Perform works of items 1 of ①, 1 of ② and 1 of ③. 2) Remove the flap connector (CN33, White, 5P) connected to the control P.C. board, and then remove the lead wire from the clamp. **NOTE :** Remove the connector by releasing locking of the housing. 3) Remove screws fixing the ceiling panel. (M5, 4 pcs.) 4) Push the tentative hook outward to remove the ceiling panel. **2. Attachment** 1) Hang the tentative hook of the main body drain pan to the tentative hook of the ceiling panel. **NOTE :** A panel has directional property, so mount a panel with attention to the marks. 2) Tighten fixing screws. (M5, 4 pcs.) 3) Connect flap connector of the ceiling panel to connector (CN33, White, 5P) on the control P.C. board.	  

No.	Part name	Procedure	Remarks
⑤	Control P.C. board	**1. Detachment** 1) Perform works of items 1 of ① and 1 of ②. 2) Remove connectors which are connected from the control P.C. board to other parts. CN33 : Flap motor (5P: White) CN34 : Float switch (3P: Red) CN41 : Terminal block of remote controller (3P: Blue) CN68 : Drain pump (3P: Blue) CN67 : Terminal block of power supply (5P: Black) CN101 : TC sensor (2P: Black) CN102 : TCJ sensor (2P: Red) CN104 : Room temperature sensor (2P: Yellow) CN333 : Power supply of fan motor (5P: White) CN334 : Position detection of fan motor (5P: White) **NOTE :** Remove the connector by releasing locking of the housing. 3) Unlock locking of the card-edge spacer at 6 positions to remove the control P.C. board. **2. Attachment** 1) Fix the control P.C. board to the card-edge spacer at 6 positions. 2) Connect the connectors removed in item 1 to the original positions.	

No.	Part name	Procedure	Remarks
⑥	Fan motor	**1. Detachment** 1) Perform works of items 1 of ① and 1 of ②. 2) Remove clamps of the lead wires connected to the following connectors of the control P.C. board. CN33 : Flap motor (5P: White) CN34 : Float switch (3P: Red) CN68 : Drain pump (3P: Blue) CN101 : TC sensor (2P: Black) CN102 : TCJ sensor (2P: Red) CN333 : Power supply of fan motor (5P: White) CN334 : Position detection of fan motor (5P: White) **NOTE :** Remove the connector by releasing locking of the housing. 3) Remove screws fixing earth lead wire in the electric parts box. (Ø4 x 6, 2 pcs.) 4) Remove indoor/outdoor inter-unit cable and remote controller cable of the terminal block. 5) Remove screws fixing the electric parts box. (Ø4 x 10, 5 pcs.) 6) Remove screws fixing the bell mouth. (Ø4 x 10, 6 pcs.) 7) Remove nuts fixing the turbo fan. (M6, 1 pc.) 8) Remove screws fixing holder of the motor lead wires to remove the motor lead wires from the clamp. (Ø4 x 8, 3 pcs.) 9) Remove nuts fixing the fan motor to remove it. **2. Attachment** 1) Fix the parts, fan motor, holder of the motor lead, turbo fan, bell mouth, and electric parts box successively to their original positions. **NOTE 1 :** When fixing the turbo fan, be sure to match the fan boss with D-cut of the motor shaft. **NOTE 2 :** Fix the turbo fan with torque wrench 5.9 ± 0.6Nm. 2) Connect connectors, earth lead wire, indoor/outdoor inter-unit cable, and remote controller cable which have been disconnected in the above item 1 as before.	    

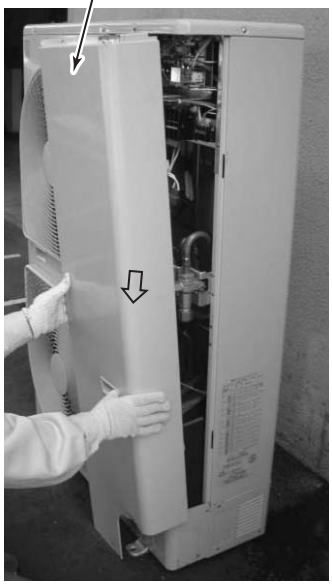
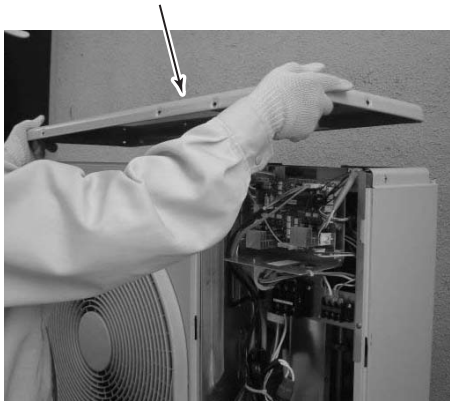
No.	Part name	Procedure	Remarks
⑦	Drain pan	**1. Detachment** 1) Perform works of items 1 of ①, 1 of ②, 1 of ③ and 1 of ④. 2) Remove clamps of the lead wires connected to the following connectors of the control P.C. board. CN34 : Float switch (3P: Red) CN68 : Drain pump (3P: Blue) CN101 : TC sensor (2P: Black) CN102 : TCJ sensor (2P: Red) CN333 : Power supply of fan motor (5P: White) CN334 : Position detection of fan motor (5P: White) **NOTE :** Remove the connector by releasing locking of the housing. 3) Remove screws fixing earth lead wire in the electric parts box. (Ø4 x 6, 2 pcs.) 4) Remove indoor/outdoor inter-unit cable and remote controller cable of the terminal block. 5) Remove screws fixing the electric parts box. (Ø4 x 10, 5 pcs.) 6) Remove screws fixing the bell mouth. (Ø4 x 10, 6 pcs.) 7) Remove the drain cap, and drain water accumulated in the drain pan. **NOTE 1 :** When removing the drain cap, be sure to prepare a bucket to catch the drained water. **NOTE 2 :** Thermal insulator is adhered to the drain cap. Be careful not to peel off the insulator. If the insulator has been peeled, adhere it with double-face tape, etc. as before. 8) Remove screws fixing the drain pan. (Ø4 x 8, 4 pcs.) **2. Attachment** 1) Fix the parts, drain cap, drain pan, bell mouth, and electric parts box successively to their original positions. 2) Connect connectors, earth lead wire, indoor/outdoor inter-unit cable, and remote controller cable which have been disconnected in the above item 1 as before.	  

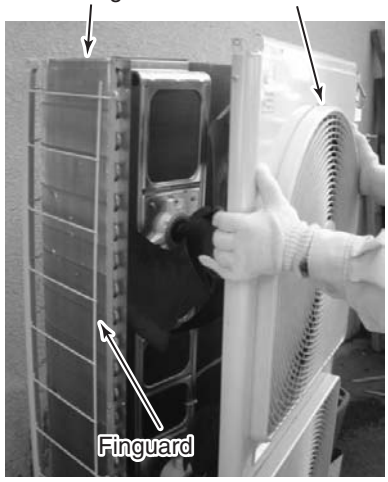
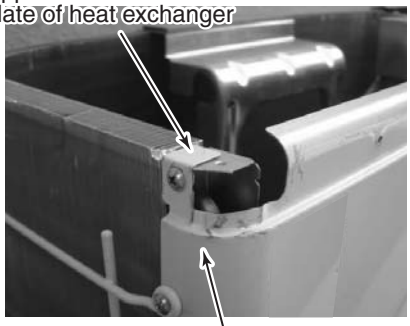
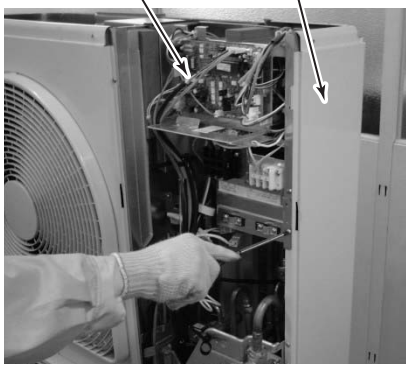
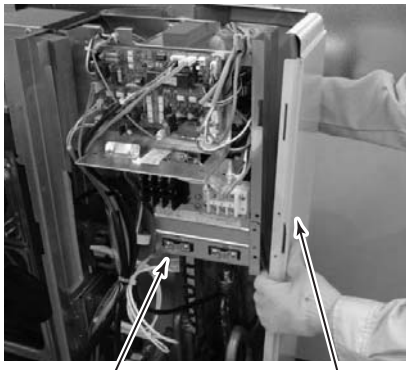
No.	Part name	Procedure	Remarks
⑧	Drain pump assembly	**1. Detachment** 1) Perform works of items 1 of ①, 1 of ②, 1 of ③, 1 of ④ and 1 of ⑦. 2) Picking the hose band, slide it from pump connecting part to remove the drain hose. 3) Remove screw fixing the drain pump assembly, slide hooking claws of the drain pump assembly and the main body (1 position), and then remove the assembly. (Ø4 x 8, 3 pcs.) **3. Attachment** 1) Fix the drain pump assembly as before. **NOTE :** The drain pump is fixed with a hook and 3 screws. In screwing, be sure that screws do not to run on hooking claw at the main body side. 2) Attach the drain hose and hose band as before. **NOTE :** Insert the drain hose up to the end of pump connecting part, and bind the white mark position of the hose with band.	  

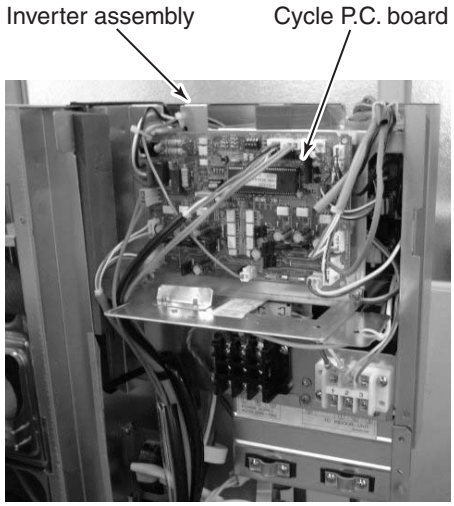
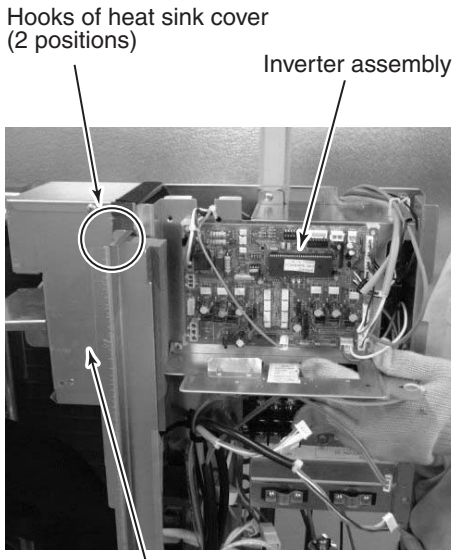
No.	Part name	Procedure	Remarks
⑨	Heat exchanger	**1. Detachment** 1) Recover refrigerant gas. 2) Remove refrigerant pipe at the indoor unit side. 3) Perform works of items 1 of ①, 1 of ②, 1 of ③, 1 of ④ and 1 of ⑦. 4) Remove screws fixing the pipe cover. (Ø4 x 8, 2 pcs.) 5) Remove the heat exchanger by removing fixing band and fixing screws while holding the heat exchanger. (Ø4 x 8, 3 pcs.) **2. Attachment** 1) Fix the parts, heat exchanger, fixing band, pipe cover, drain cap, drain pan, bell mouth, and electric parts box successively to their original positions. 2) Connect connectors, earth lead wire, indoor/outdoor inter-unit cable, and remote controller cable which have been disconnected in the above item 1 as before. 3) Connect the refrigerant pipe as before, and then perform vacuuming.	  

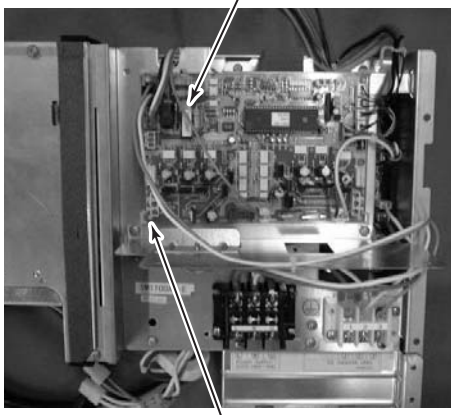
12-2. Outdoor Unit

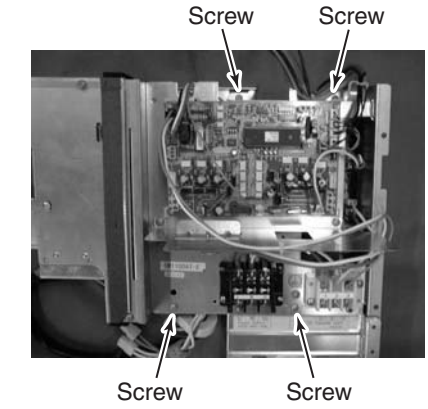
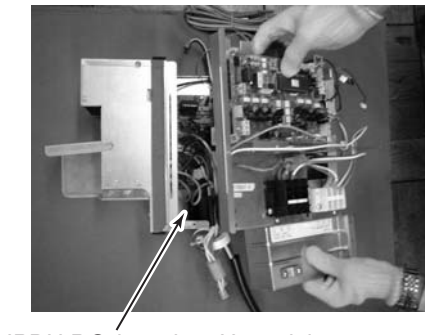
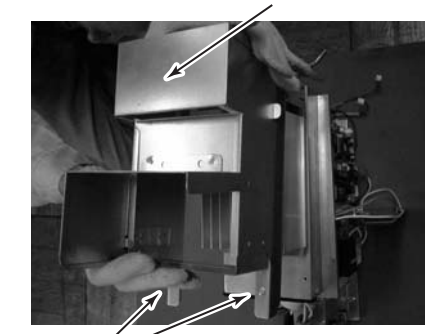
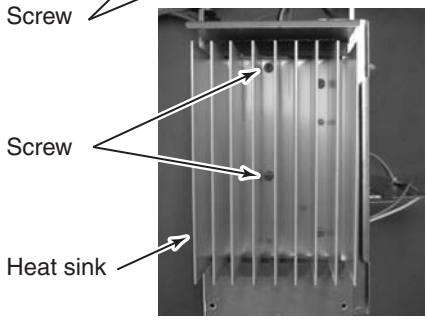
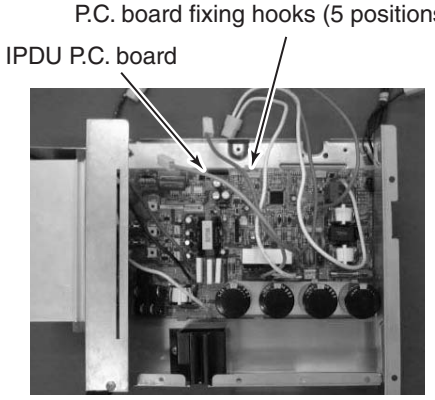
RAV-SM1100AT-E, RAV-SM1400AT-E

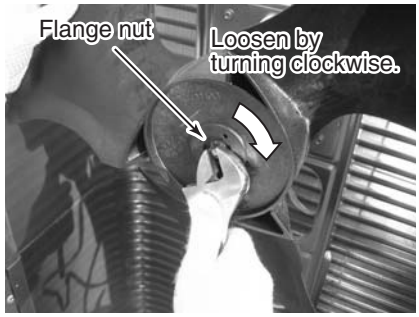
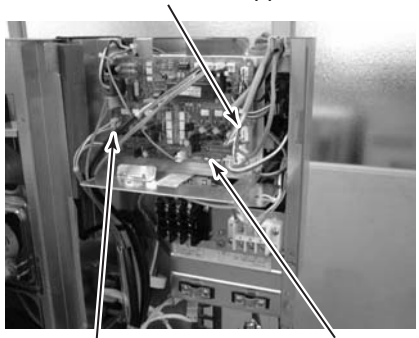
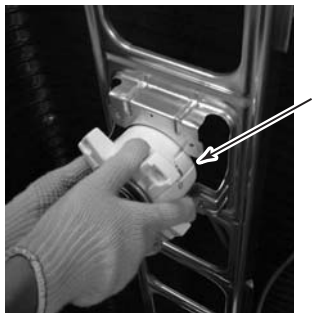
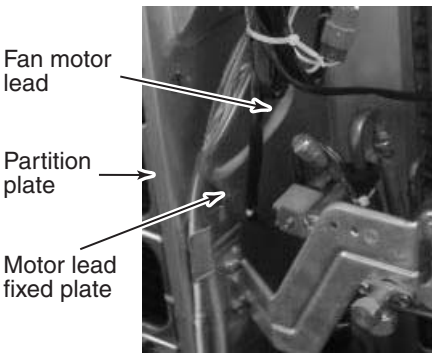
No.	Part name	Procedure	Remarks
①	Common procedure	**REQUIREMENT** Before works, put on gloves, otherwise an injury may be caused by parts, etc. **1. Detachment** 1) Stop operation of the air conditioner, and turn off switch of the breaker. 2) Remove the front panel. (ST1T Ø4 × 10, 3 pcs.) • After removing the screws, remove the front panel while drawing it downward. 3) Remove the power cable and the indoor/outdoor connecting cable from cord clamp and terminal. 4) Remove the roof plate. (ST1T Ø4 × 10, 6 pcs.) **2. Attachment** 1) Mount the roof plate. (ST1T Ø4 × 10, 6 pcs.) 2) Connect the power cable and the indoor/outdoor connecting cable to terminal, and then fix them with cord clamp. **REQUIREMENT** Be sure to fix the power cable and the indoor/outdoor connecting cable with bundling band on the market along the inter-unit cable so that they do not come to contact with the compressor, the valve and the cable at gas side, and the discharge pipe. 3) Attach the front panel. (ST1T Ø4 × 10, 3 pcs.)	Front panel  Roof plate 

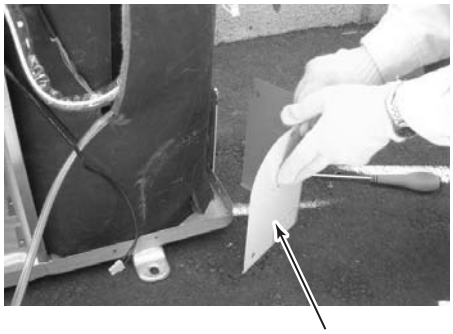
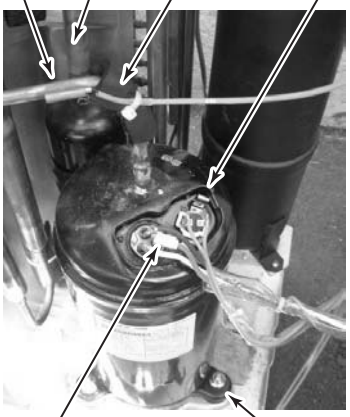
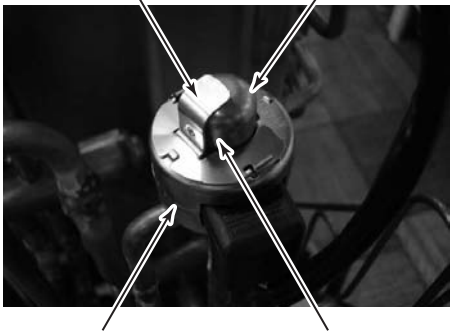
No.	Part name	Procedure	Remarks
②	Air-outlet cabinet	**1. Detachment** 1) Perform the work in 1 of ①. 2) Take off screws for the air-outlet cabinet and the partition plate. (ST1T Ø4 × 10, 3 pcs.) 3) Take off screws for the air-outlet cabinet and the base plate. (ST1T Ø4 × 10, 2 pcs.) 4) Take off screw for the air-outlet cabinet and the heat exchanger. (ST1T Ø4 × 10, 1 pc.) 5) Take off screws for the air-outlet cabinet and the fin guard. (ST1T Ø4 × 10, 2 pcs.) **2. Attachment** 1) Put the upper left side of the air-outlet cabinet on the end plate of heat exchanger, and fix it with screw. (ST1T Ø4 × 10, 1 pc.) 2) Attach the taken-off screws to the original positions.	Heat exchanger Air-outlet cabinet  Upper side of the end plate of heat exchanger  Air-outlet cabinet
③	Side cabinet	1) Perform the work in 1 of ①. 2) Take off screws fixing the inverter and the side cabinet. (ST1T Ø4 × 10, 2 pcs.) 3) Take off screws for the side cabinet and the valve fixed plate. (ST1T Ø4 × 10, 2 pcs.) 4) Take off screw for the side cabinet and the piping panel (Rear). (ST1T Ø4 × 10, 1 pc.) 5) Take off screw for the side cabinet and the base plate. (ST1T Ø4 × 10, 1 pc.) 6) Take off screws for the side cabinet and the fin guard. (ST1T Ø4 × 10, 4 pcs.)	Inverter Side cabinet   Valve fixed plate Side cabinet

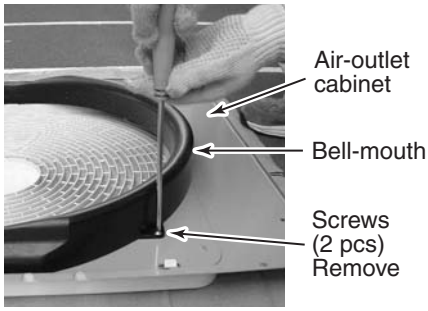
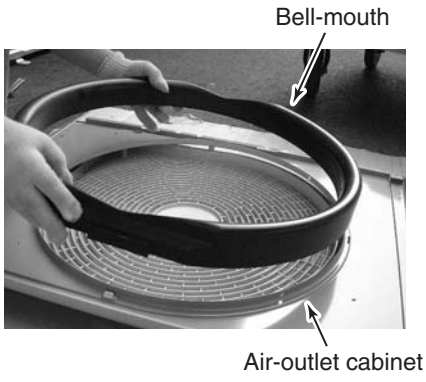
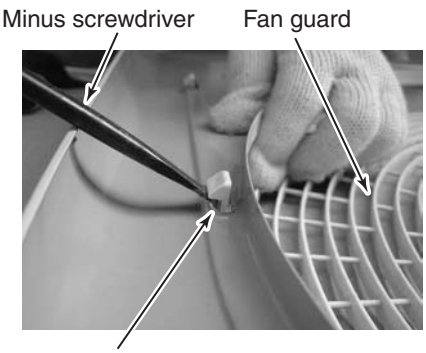
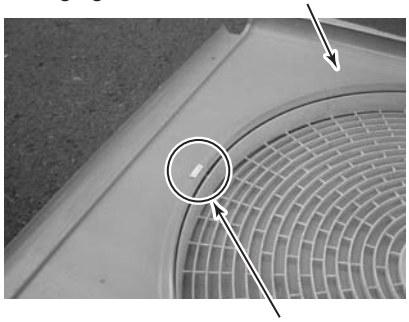
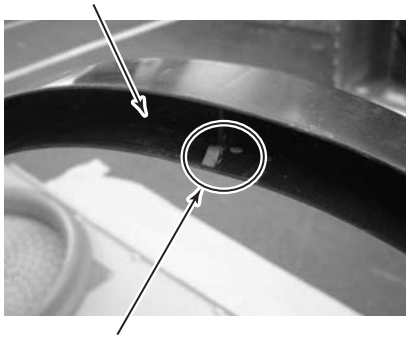
No.	Part name	Procedure	Remarks
④	Inverter assembly	1) Perform the works in 1 of ① and ③. 2) Remove connectors which are connected from the cycle P.C. board to other parts. CN600: TD sensor (3P: White) CN601: TO sensor (2P: White) CN604: TE sensor (2P: White) *(Note 1) CN605: TS sensor (3P: White) *(Note 1) CN301: Upper outdoor fan (3P: White) *(Note 1) CN300: Detection of upper position (5P: White) CN303: Lower outdoor fan (3P: White) *(Note 1) CN302: Detection of lower position (5P: White) CN500: Case thermo. (2P: White) *(Note 1) CN700: 4-way valve (3P: Yellow) *(Note 1) CN702: PMV (Pulse Motor Valve) coil (6P: White) Relay connector: Reactor 2 pcs. (3P: White) *(Note 1) Compressor lead: Remove terminal cover of the compressor, and remove the lead wire from terminal of the compressor. ***(Note 1)** Remove the connectors by releasing lock of the housing. 3) Remove various lead wires from the holder at upper part of the inverter. 4) Cut off tie lap which fixes various lead wires to the inverter assembly. 5) Lift up the hook (upper left) with the partition plate upward just removing. * Caution to mount the inverter assembly Mount the inverter assembly to the partition plate so that hooks of the heat sink cover do not come near the partition plate but also near the fan side.	 

No.	Part name	Procedure	Remarks
⑤	Cycle P.C. board	1) Perform the works in 1 of ① and ③. 2) Remove connectors and lead wires which are connected from the cycle P.C. board to other parts. 1. Connector CN800: Connection with IPDU P.C. board (5P: Red) CN01: Connection with IPDU P.C. board (5P: Red) *(Note 1) CN02: Indoor/Outdoor connection terminal block (3P: Black) *(Note 1) CN03: Connection with IPDU P.C. board (3P: White) *(Note 1) CN04: Connection with IPDU P.C. board (2P: White) *(Note 1) ***(Note 1)** Remove the connectors by releasing lock of the housing. 3) Remove the supporting hooks at 4 corners to remove the cycle P.C. board. 4) Mount a new cycle P.C. board. 5) Lift up the hook (upper left) with the partition plate upward just removing.	Cycle control P.C. board assembly  P.C. board fixing hooks (4 positions)

No.	Part name	Procedure	Remarks
⑥	IPDU P.C. board	1) Perform the works in ④ and ⑤. 2) Take off screws of the inverter assembly to separate the inverter assembly. (M4 × 8, 4 pcs) 3) Remove the connectors and the lead wires which are connected from IPDU P.C. board to the other parts. 1. Connector CN04: Connection with cycle P.C. board (3P: White) CN05: Connection with cycle P.C. board (2P: White) *(Note 1) CN06: Connection with cycle P.C. board (5P: White) CN13: Connection with cycle P.C. board (5P: Red) *(Note 1) CN600: Heat sink sensor (2P: Black) 2. Lead wire CN01: Connection with power terminal block (Red) CN02: Connection with power terminal block (White) CN03: Connection with inverter box (Black) CN09: Connection with compressor (Red) CN10: Connection with compressor (White) CN11: Connection with compressor (Black) Rectifier diode ⊕ : Red lead wire *Note 2 ⊖ : White lead wire *Note 2 ~ (Top) : Orange lead wire ~ (Bottom) : Brown lead wire ***(Note 1)** Remove the connectors by releasing lock of the housing. 4) Remove the heat sink cover. (M4 × 8, 2pcs) 5) Take off two screws which fix the heat sink and IGBT and also take off support hooks of the P.C. board (5 positions) to remove IPDU P.C. board. 6) Mount a new IPDU P.C. board. ***(Note 2)** The rectifier diode has polarity, so be careful to ⊕ and ⊖. If ⊕ and ⊖ are mistaken, a trouble is caused.	    

No.	Part name	Procedure	Remarks
⑦	Fan motor	1) Perform the works in 1 of ① and 1 of ②. 2) Take off flange nut fixing the fan motor with the propeller fan. • Loosen the flange nut by turning clockwise. (When tightening, turn it counterclockwise.) 3) Remove the propeller fan. 4) Remove connector for the fan motor from the inverter. 5) Take off fixing screws (4 pcs) with supporting the fan motor so that it does not fall down. 6) When replacing the fan motor at lower side, remove the motor lead fixed plate which is fixed to the partition plate with screw (ST1Tf4´10, 1 pc), pull the fan motor lead out of the partition plate, and then remove the fan motor. *** Cautions in assembling fan motor** **<In case of RAV-SM1100AT-E>** • Be sure to mount the propeller fan and the fan motor at upper and lower sides because they are different. • Tighten the flange nut with the following torque. Upper side: 9.8N·m (100kgf·cm) Lower side: 4.9N·m (50kgf·cm) **<In case of RAV-SM1400AT-E>** • The same propeller fan and the fan motor are used at upper and lower sides. • Tighten the flange nut with the following torque. Upper side: 9.8N·m (100kgf·cm) Lower side: 9.8N·m (100kgf·cm) • Be sure to mount the motor lead fixed plate so that the fan motor lead is not caught in. • Be sure that the propeller fan does not come to contact with the fan motor lead.	 Propeller fan Fan motor connector at upper side  Cycle P.C. board Fan motor connector at lower side  

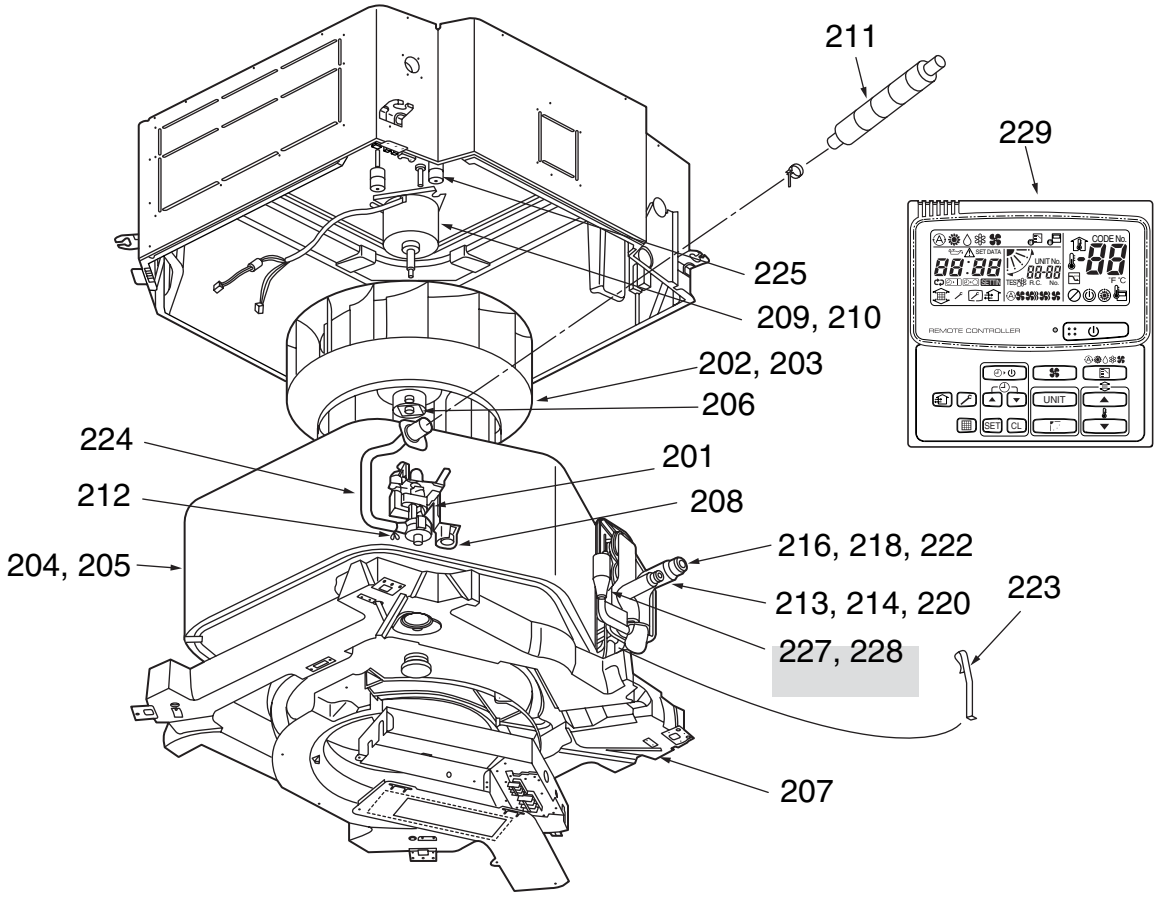
No.	Part name	Procedure	Remarks
⑧	Compressor	1) Recover refrigerant gas. 2) Perform the works in 1 of ① and in ③. 3) Remove the piping panel (Front). Take off screws of the piping panel (Front) and the base plate. (ST1T Ø4 × 10, 2 pcs) Take off screws of the piping panel (Front) and the piping panel (Rear). (ST1T Ø4 × 10, 2 pcs) 4) Remove the piping panel (Rear). Take off screws of the piping panel (Rear) and the base plate. (ST1T Ø4 × 10, 2 pcs) 5) Remove the sound-insulation plate. 6) Remove terminal cover of the compressor, and then remove compressor lead and case thermo. of the compressor. (ST1T Ø4 × 10, 2 pcs) 7) Remove TD sensor fixed to the discharge pipe. 8) Using a burner, remove pipe connected to the compressor. **NOTE)** Pay attention that 4-way valve or PMV is not exposed to a flame. (Otherwise, a malfunction may be caused.) 9) Pull out discharge pipe and suction pipe of the refrigerating cycle upward. 10) Take off the compressor nuts (3 pcs) fixing the compressor to the base plate. 11) Draw out the compressor toward you.	 Piping panel (Front) Piping panel (Rear) Remove (Suction pipe) Remove (Discharge pipe) TD sensor Case thermo.  Compressor lead Compressor nuts (3 pcs)
⑨	PMV coil	**1. Detachment** 1) Perform the works in 1 of ① and in ③. 2) Hold outside of the coil by hands and turn it while lifting upward. The fixing hooks come off the fixing concavities and then the coil can be removed from PMV body. **2. Attachment** 1) Match the positioning extrusion of the coil surely to the concave part of PMV body, and then fix it.	Positioning extrusion PMV body  PMV coil Concave part

No.	Part name	Procedure	Remarks
⑩	Fan guard	**1. Detachment** 1) Perform the works in 1 of ① and in 1 of ②. **REQUIREMENT** To prevent damage on the products, treat component on a corrugated paper, cloth, etc. 2) Remove the air-outlet cabinet, and then put down it directing the fan guard side downward. 3) Take off screws fixing the bell-mouth. (ST1T Ø4 × 10, 2 pcs) 4) Remove the bell-mouth. 5) Take off screws fixing the fan guard. (ST1T Ø4 × 10, 2 pcs) 6) Remove hanging hook of the fan guard by pushing with a minus screwdriver. **2. Attachment** 1) Insert the extrusion at the upper side of the fan guard into the square hole of the air-outlet cabinet, and then insert the hanging hook. Fix the hanging hooks (5 positions) by pushing with hands. **REQUIREMENT** Check that all the hanging hooks are fixed to the specified positions. 2) After attachment, fix it with screws. (ST1T Ø4 × 10, 2 pcs) 3) Mount the bell-mouth by hanging hooks (3 positions) at upper side of the bell-mouth to the square holes of the air-outlet cabinet. 4) After attachment, fix it with screws. (ST1T Ø4 × 10, 2 pcs) * **Caution in assembling bell-mouth** • The size (color) of the bell-mouth at upper side differs from that at lower side. (Only for RAV-SM1100AT-E) **<In case of RAV-SM1100AT-E>** Upper side: Black Lower side: Gray **<In case of RAV-SM1400AT-E>** Upper side: Black Lower side: Black	    

13. EXPLODED VIEWS AND PARTS LIST

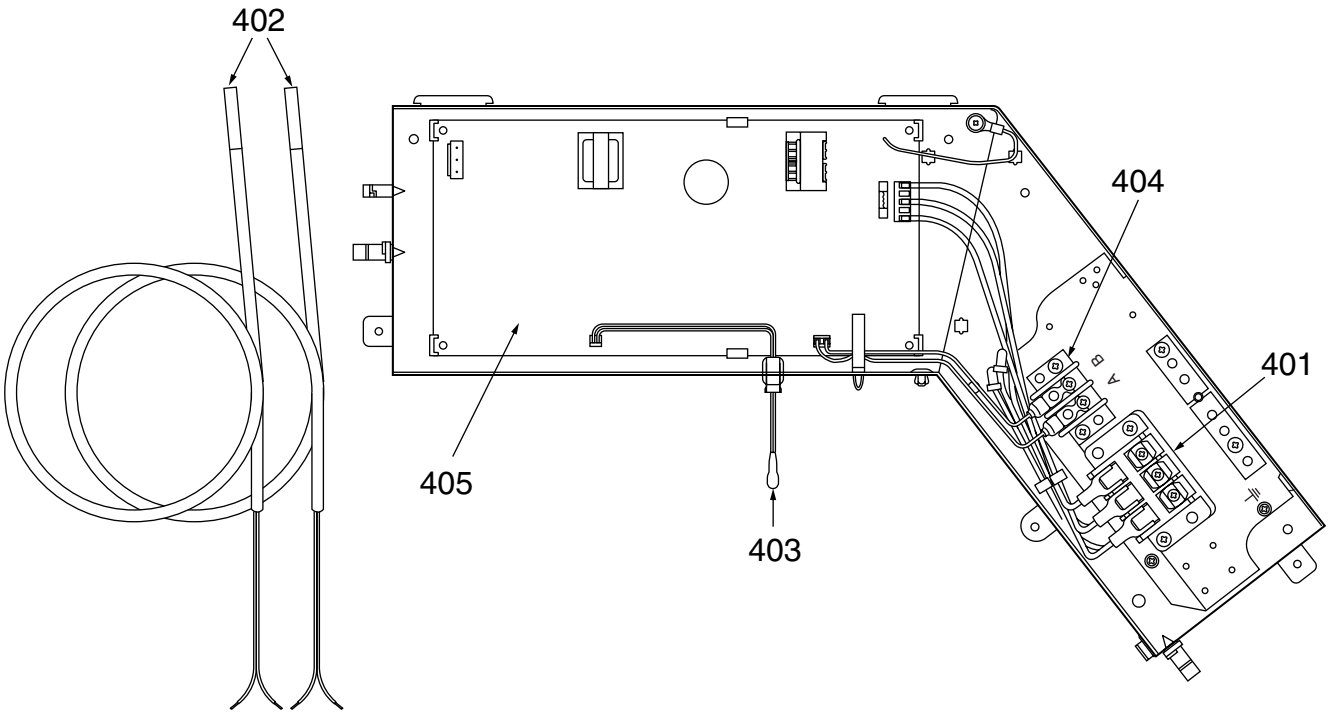
13-1. Indoor Unit

RAV-SM1100UT-E/RAV-SM1400UT-E



Location No.	Part	Description
201	43121703	Pump, Drain, ADP-1409, 220-240V
202	43120214	Fan, Ass'y Turb, TY461 (SM1400UT-E)
203	43120215	Fan, Ass'y Turb, TJ461 (SM1100UT-E)
204	4314J123	Refrigeration Cycle Ass'y (SM1100UT-E)
205	4314J124	Refrigeration Cycle Ass'y (SM1400UT-E)
206	4318T313	Owner's Manual
207	43172160	Pan Ass'y, Drain, PS-F+ABS, Sheet
208	43151279	Switch, Float, FS-0218-106
209	43121691	Motor, Fan, SWF-200-90-1 (SM1400UT-E)
210	43121692	Motor, Fan, SWF-230-60-1 (SM1100UT-E)
211	43170232	Hose, Drain, 25A

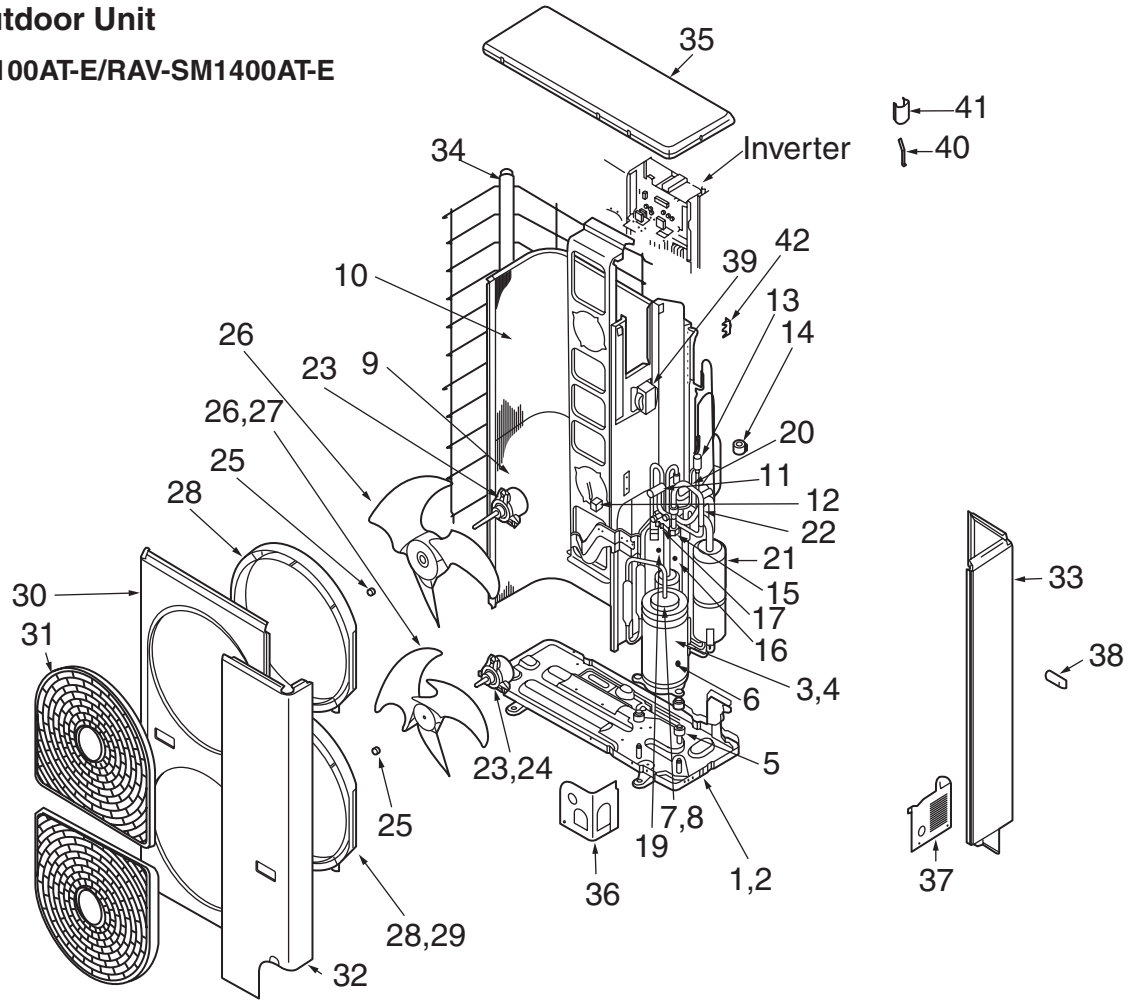
Location No.	Part	Description
212	43079249	Band, Hose
213	43047546	Nut, Flare, 3/8 IN, Ø9.62
214	43194026	Socket, Ø9.62
216	43194078	Nut, Flare, 5/8 IN, Ø15.88
218	43194079	Socket, 5/8 IN, Ø15.88
220	43047609	Bonnet, Ø9.62
222	43194029	Bonnet, Ø15.88
223	43019904	Holder, Sensor, SUS
224	43170231	Hose, Drain
225	43139137	Rubber, Cushion
226	43097204	Nut
228	43147657	Distributor Ass'y (SM1100UT-E)
229	4316V194	Remote Controller, SX-A3JE
230	4316V195	Remote Controller, SX-A11JE
231	4316V196	Remote Controller, EX-W2JE
232	4316V197	Remote Controller, WH-H1JE



Location No.	Part	Description
401	43060750	Terminal Block, 3P
402	43050382	Sensor, TC (F6)
403	43150297	Sensor, TC
404	43160445	Terminal Block, 2P, 1A, AC30V
405	4316V220	P.C. Board Ass'y, MMC-1402 (220–240V)

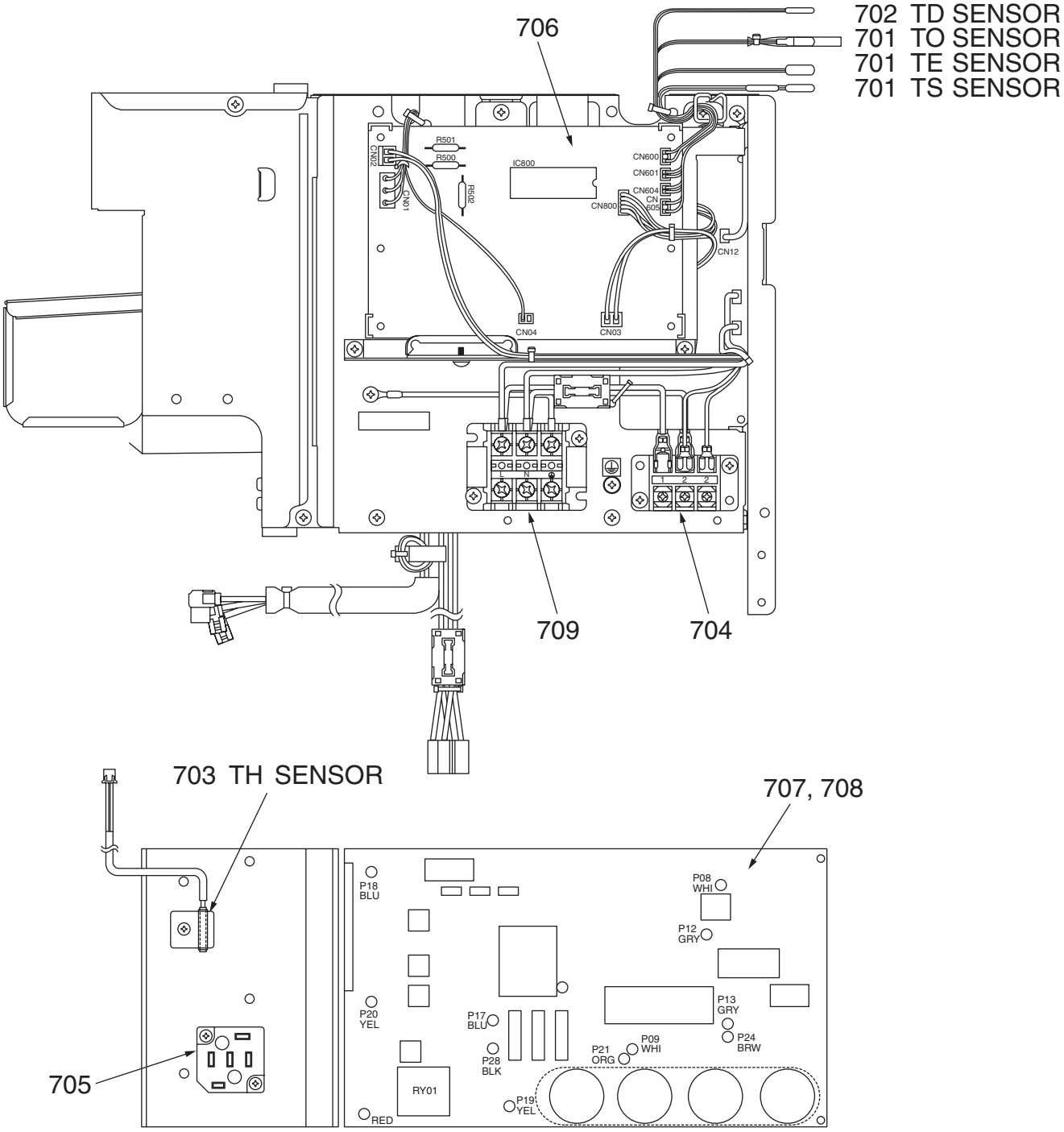
13-2. Outdoor Unit

RAV-SM1100AT-E/RAV-SM1400AT-E



Location No.	Part	Description
1	43005482	Base Ass'y (SM1100AT-E)
2	43100248	Base Ass'y (SM1400AT-E)
3	43041772	Compressor Ass'y, DA220A2F-20L (SM1100AT-E)
4	43041774	Compressor Ass'y, DA420A3F-21M (SM1400AT-E)
5	43049739	Cushion, Rubber
6	43097204	Nut
7	43050407	Thermostat, Bimetal
8	43063317	Holder, Thermostat
9	4314G152	Condenser, Ass'y, Down
10	4314G154	Condenser, Ass'y, Up
11	43146619	Valve, 4-WAY, STF-0213Z
12	43146611	Coil, Solenoid, VHV-01AJ502E1, AC 220–240V
13	43146634	Valve, Pulse, Modulating, UKV-25D22
14	43146614	Coil, PMV
15	43146613	Valve, Ball, 5/8 IN
16	43147194	Bonnet, 5/8 IN
17	43146584	Valve, Packed, 3/8 IN
19	43047401	Bonnet, 3/8 IN
20	43147611	Strainer

Location No.	Part	Description
21	43148170	Accumulator Ass'y, 2.5L
22	43148176	Strainer
23	43121704	Motor, Fan, ICF-140-63-2
24	4302C040	Motor, Fan, ICF-140-43-2 (SM1100AT-E)
25	43047667	Nut, Flange
26	43120213	Fan, Propeller, PJ491, AS-G
27	43020329	Fan, Propeller, PJ421, AS-G (SM1100AT-E)
28	43122065	Bell Mouth, Plastic
29	43122074	Bell Mouth, PP (SM1100AT-E)
30	43191606	Panel, Air Outlet
31	43191630	Guard, Fan, PP-K
32	43191607	Panel, Front
33	43191608	Panel, Side
34	43191602	Guard, Fin
35	43191609	Plate, Roof
36	43191515	Panel, Front, Piping
37	43191605	Panel, Back, Piping
38	43119390	Hanger
39	43155188	Peacter, CH-56-2Z-T
40	43019904	Holder, Sensor, SUS
41	43063188	Holder, TC Sensor
42	43063332	Holder, Sensor
43	43032441	Nipple, Drain



Location No.	Part	Description
701	43050382	Sensor, TC (F6)
702	43050384	Sensor, TD
703	43050398	Sensor, TH (F4)
704	43060750	Terminal Block, 3P
705	43150259	Rectifier
706	4316V217	P.C. Board Ass'y, CDB, MCC-1398, 2-Fan

Location No.	Part	Description
707	4316V218	P.C. Board Ass'y, IPDU, MCC-1438 (SM1100AT)
708	4316V219	P.C. Board Ass'y, IPDU, MCC-1438 (SM1400AT)
709	43160552	Terminal Block, 3P (Power Supply)

CORD HEATER INSTALLATION WORK

Applicable Models: RAV-SM1100AT-E, RAV-SM1400AT-E

1. Required parts for installation work (Recommendation)

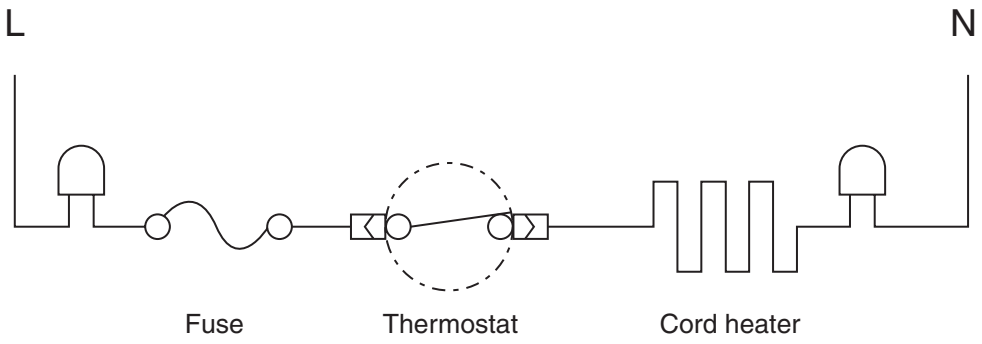
No.	Part name	Q'ty	Specifications/Vendor	Remarks
1	Cord heater	1	Drain line heaters CSC2 (3.0m, 40W/m) by Flexelec com. (Please go to the following URL.) http://www.flexelec.com	Procured locally
2	Thermostat	1	US-622AXRLQE by ASAHI KEIKI Operating temperature: on 4 ± 4°C, off 15 ± 3°C A thermostat holder is incorporated with a thermostat in the package. (Please go to the following URL.) http://www.asahikeiki.co.jp/product/product.html On self-responsibility, you can use a product manufactured by other company (For example, Texas Instruments) if its characteristics are equivalent to those of ASAHI KEIKI. However, when the shape of the thermostat holder is different from that of ASAHI KEIKI, apply some treatment to No.13 themostat fixing plate and then fix the holder.	Procured locally
3	Fuse	1	ES3-5000, 250V / 5A by NAGASAWA Electric Co. (Please go to the following URL.) http://www.nagasawa-el.co.jp/ On self-responsibility, you can use a product manufactured by other company if its characteristics are equivalent to those of NAGASAWA Electric Co.	Procured locally
4	Fuse holder	1	GM1H-02 by NAGASAWA Electric Co. (Please go to the following URL.) http://www.nagasawa-el.co.jp/ On self-responsibility, you can use a product manufactured by other company if its characteristics are equivalent to those of NAGASAWA Electric Co.	Procured locally
5	P-shape clamp	16	Use heat-resistance, weatherproof and non-hydrolytic type. Material: 4-fluorinated ethylene copolymer Harness diameter: Ø7.5 Use equivalence with the above specifications. 12 pieces are used to fix the cord heater to the outdoor unit base. One piece is used to fix the power cords to the thermostat fixing plate.	Procured locally
6	Screw	15	Self-tapping screw type-B Ø4 × 6mm, truss head, stainless These screws are used to fix the cord heater to the outdoor unit base with P-shape clamp.	Procured locally
7	Screw	3	Self-tapping screw type-B Ø4 × 8mm, truss head, stainless Two screws are used to fix the thermostat fixing plate to the back cabinet. One screw is used to fix the power cord to the thermostat fixing plate.	Procured locally
8	Screw	2	Self-tapping screw type-B Ø3.5 × 8mm, pan head These screws are used to fix the thermostat to the thermostat fixing plate with the thermostat holder.	Procured locally
9	Faston	2	#250 They are used for the connecting part to the thermostat.	Procured locally
10	Sleeve for Faston	2	UL sleeve for #250	Procured locally
11	Close-end connector	2	Use the most appropriate connector with the power cord diameter.	Procured locally
12	Power cord	1	2-cores x 0.75mm² or more, H05RN-F	Procured locally
13	Thermostat fixing plate	1	Material: SGCC-Z08, Board thickness: 0.8t	Procured locally (Drawing attached)

NOTE: The parts on the above table are recommended parts.

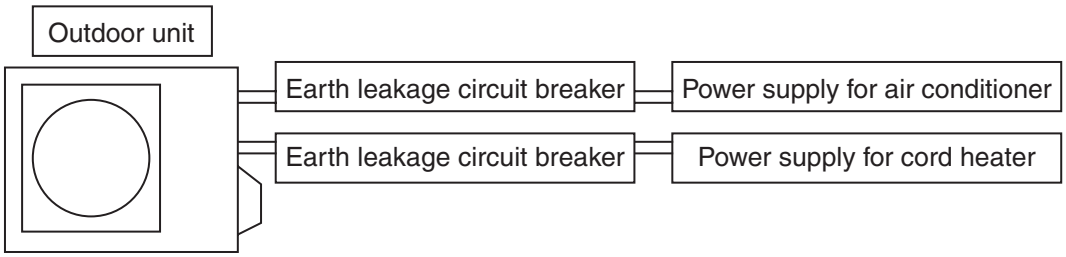
2. Required tools for installation work

No.	Part name	Specifications	Usage
1	Plus screwdriver		It is used for disassembling and assembling of each cabinet.
2	Wrench		It is used for disassembling and assembling of compressor fixing nuts.
3	Motor drill	Drill diameter: Ø3.2 and Ø5.0	It is used to make the additional holes on the base or the back cabinet.
4	Faston crimping tool	Fixing jig for #250	
5	Close-end connector crimping tool		
6	Cutting plier		
7	Stripper		
8	Cutter knife		
9	Insulation tape		

3. Cord heater installation wiring diagram



* Be sure to connect the fuse and the thermostat to LIVE side of the cord heater.


Outdoor unit
Earth leakage circuit breaker
Power supply for air conditioner
Earth leakage circuit breaker
Power supply for cord heater

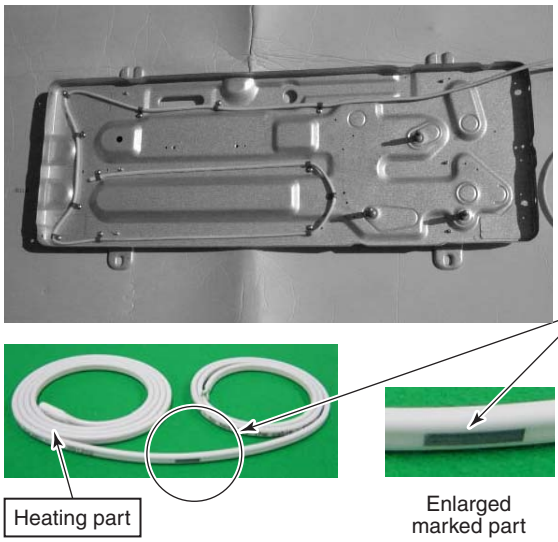
NOTE:

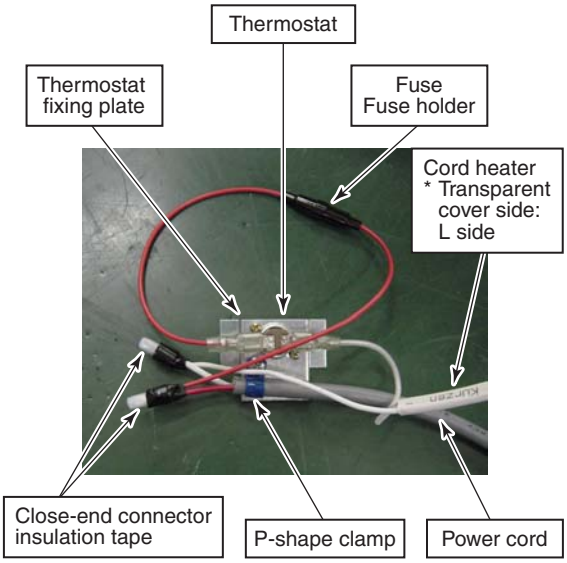
Separate the cord heater power from the air conditioner power, and connect it to its exclusive breaker.

By doing so, the power consumption can be decreased because the breaker can be turned off if there is no possibility of freezing of the base in cooling operation, etc.

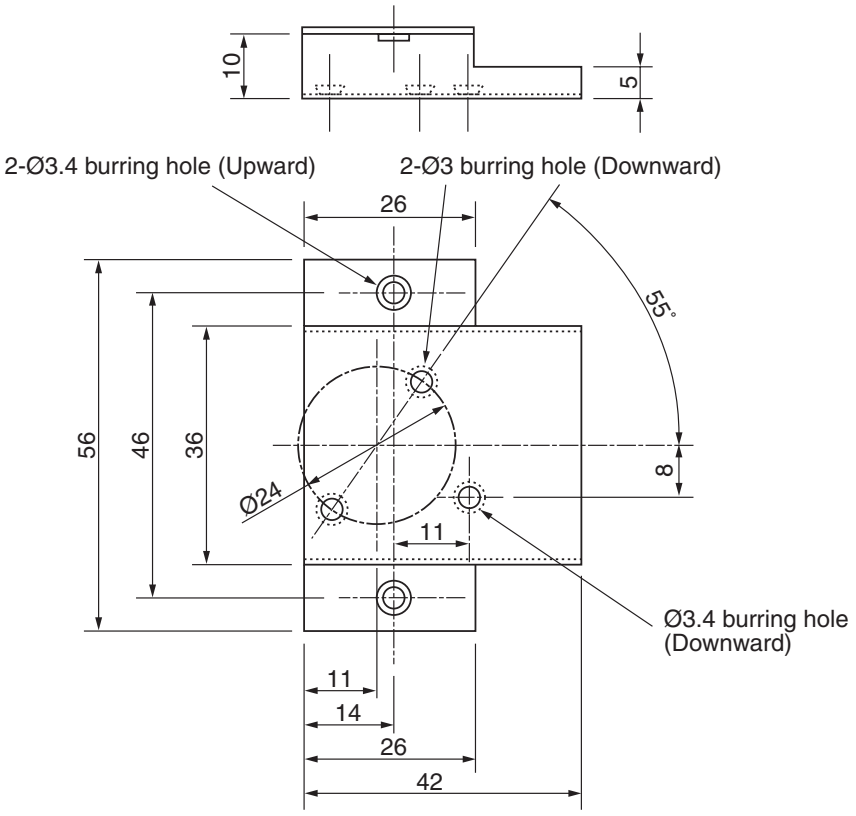
When the cord heater power is connected to the inverter P.C. board assembly or others without connected to the exclusive breaker, the control P.C. board of the inverter assembly may cause a failure.

4. Cord heater installation work procedure

No.	Photo / Explanatory diagram	Procedure
1	Remove each cabinet, inverter assembly, motor base assembly, and partition board assembly. * Do not damage the electric parts such as cables, connectors, etc. while this work.	
1-2	**<Example for RAS-13JAVP-E>** 	As shown in the left figure, remove the set of refrigeration cycle assembly from the outdoor unit base. * In this time, work attentively so that the cycle pipes are not damaged by dent or deformation. Apply protective measures to pipes if necessary.
2	Cord heater installation work Drill a hole on the outdoor unit base, and fix the cord heater to the outdoor unit base using P-shape clamp. Connect the cord heater cables.	
2-1	Using a motor drill, etc., drill Ø3.2 holes to the existing emboss on the outdoor unit base. (12 positions)	
2-2	 	As shown in the left figure, install the cord heater to the outdoor unit base by using P-shape clamp and screws (Self-tapping screw type-B Ø4 × 6mm, stainless). Pay attention to the direction of P-shape clamp so that it is set to the same direction in the left figure. * If the drain port is frozen due to installation status, etc., draw around the cord heater so that the end part of the heater is inserted into the drain port. In this case, add some fixing positions to fix the cord heater surely. * The end part from the marked part of the cord heater heats up. When there is the heating part near the electric parts box, a fire may generate. Be sure to set the heating part on the outdoor unit base at the fan room side or near it. (within 20cm from the outdoor unit base) * Be careful that the cord heater does not hit the fan. Fix the cord heater without any loosening or sag
2-3	 	As shown in the left figure, drill a hole on the back cabinet for fixing the thermostat fixing plate. Ø5 hole at two positions When drilling a hole on the back cabinet, be sure not to damage the cabinet.

No.	Photo / Explanatory diagram	Procedure
2-4		Perform end process and bundling of each cable. Using fixing screws (Self-tapping screw type-B Ø3.5 × 8mm), fix the thermostat to the thermostat fixing plate. Perform end process for various lead cables and connect them according to the wiring diagram. Attach #250 Faston and UL-approved sleeves each to the end of lead cables which are connected to the thermostat. Using insulation tape, apply protective measures to the connected parts by the close-end connectors. Using P-shape clamp and the screws (Self-tapping screw type-B Ø4 × 8mm), fix the power cord to the thermostat fixing plate. When the power cord size does not match with P-shape clamp, procure the most appropriate one at the local site.
3	**Assembly** Return a set of the refrigeration cycle assembly into the outdoor unit base and reassemble sound insulation board, partition plate assembly, fan motor assembly, and back cabinet as original. Fix the thermostat fixing plate to the back cabinet, built in the inverter assembly, and then connect various cables. After then, incorporate front cabinet, upper cabinet, wiring cover, and valve cover as before.	
4	In installation work, connect power cord for the cord heater to another breaker separated from one for power cord of the air conditioner.	

5. Drawing of thermostat fixing plate



Material: SGCC-Z08, Thickness: 0.8t

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